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CINEMA DIGITAL SOUND

TM

OPERATION AND INSTALLATION INSTRUCTION MANUAL

for

CINEMA DIGITAL PROCESSOR
Model CDP-1000

and

CINEMA DIGITAL READER
Model CDR-7035

Document No. D114137
Revision C - January 21, 1991

CINEMA DIGITAL SOUND

Operation and Installation
Instruction Manual
for
Cinema Digital Processor
Model CDP-1000
and
Cinema Digital Reader
Model CDR-7035

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ABOUT THIS INSTRUCTION MANUAL

This instruction manual provides installation and operation procedures and reference material for users of the Optical Radiation Corporation Model CDP-1000 Cinema Digital Processor and Model CDR-7035 Reader.

The CDP-1000 and CDR-7035 are major components of the Optical Radiation Corporation Cinema Digital Sound system - a distortion-free, 6-channel, digital sound track on motion picture film system.

It is recommended that operators, installers, technicians, and other users of the CDP-1000 Processor and CDR-7035 Reader familiarize themselves completely with the instructions and reference material in this manual so as to obtain maximum benefits from the Optical Radiation Corporation CDS system.

Section 1 - INTRODUCTION of this manual provides an introduction to the CDP-1000 Cinema Digital Processor and CDR-7035 Reader and their relationship to the complete Cinema Digital Sound System.

Section II - OPERATING INSTRUCTIONS provides complete operating instructions for use by the operator, installer, and maintenance technician.

Section III - INSTALLATION provides detailed instructions for installing the CDP-1000 and CDR-7035 in the projection room.

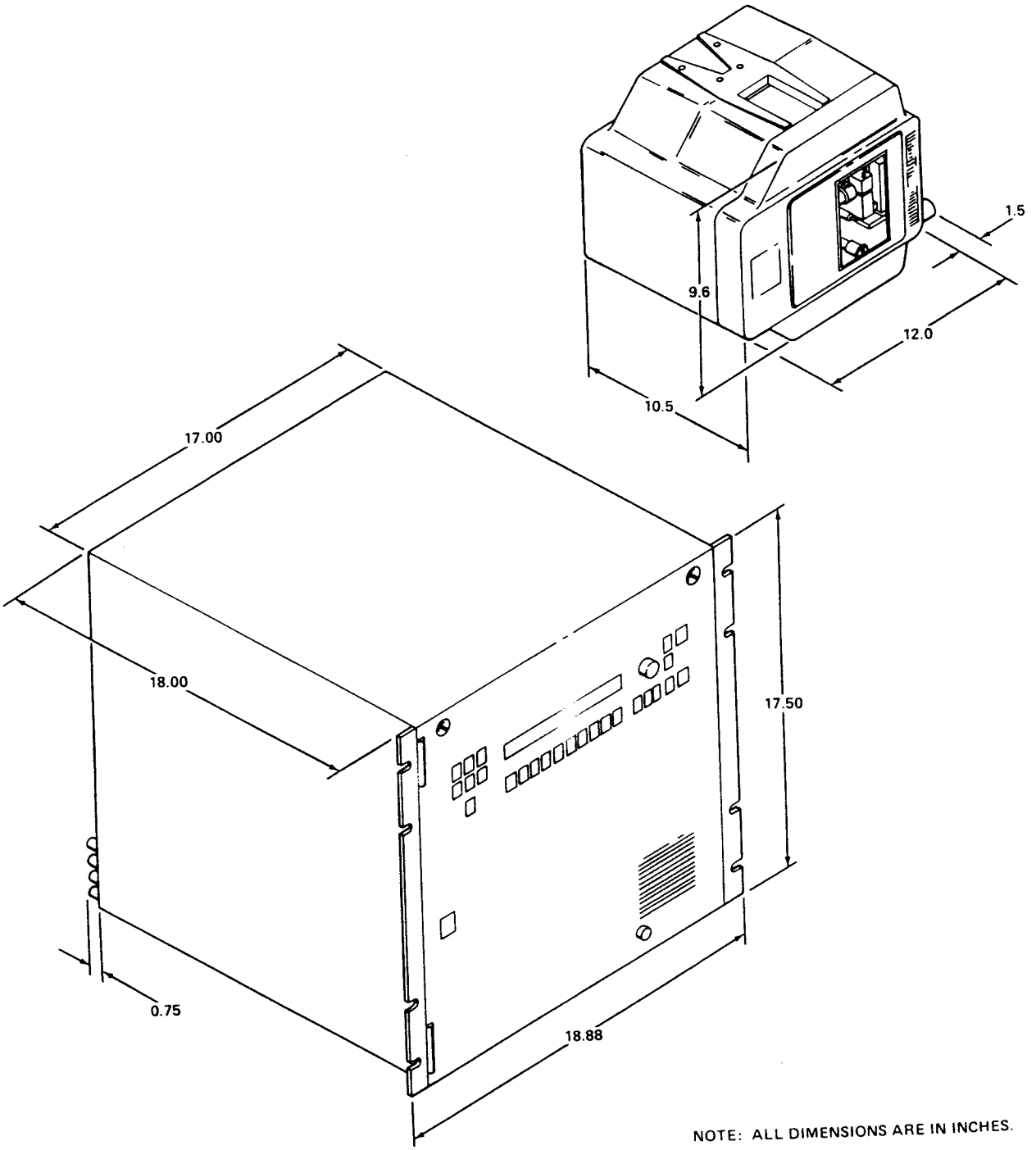
APPENDICES I through V at the rear of the manual provide additional valuable reference data.

CAUTION: The information in this instruction manual is for use by qualified personnel only. To avoid electrical shock and personal injury do not perform any operation, installation, or servicing other than that contained in this instruction manual.

IMPORTANT: All parts of the Cinema Digital Reader Mounting Hardware supplied with each reader, that is bands, gates, rollers, etc., must be used in the installation of each reader to each projector to prevent destruction to the digital sound track and the print. It is also important that any and all areas of the film path where the digital sound track may touch a band, roller, or any other object must be relieved to prevent damage to either side of the film surface.

The above applies to the makeup table, platter, guidance hardware, reels, sprockets, gates, shoes, pad arms, fail safes, etc. on the emulsion or non-emulsion side of the film.

The same procedure should be followed if an alternate mounting method for the reader is employed.



CDP-1000 Processor and CDR-7035 Reader

GENERAL DESCRIPTION

The Optical Radiation Corporation Cinema Digital Sound system writes and reads digitized optical sound on motion film to provide truly dynamic sound. Cinema Digital Sound (often shortened to "CDS" in this manual) not only offers six independent sound channels (including a subwoofer channel), but also provides a Musical Instrument Digital Interface (MIDI) control channel for synchronizing special effects in the auditorium, and SMPTE time code for booth automation.

The Cinema Digital Sound system consists of an Optical Radiation Corporation Encoder, the Model CDP-1000 Processor, and the Model CDR-7035 Reader. The Processor and Reader are covered in this instruction manual.

The digitized sound is written to the motion picture film by the CDS Encoder (also called a "writer"). The CDS Encoder can write digitized sound on both 35mm and 70mm motion picture film sizes. The CDS Encoder can be used for digital sound writing in sound facilities, studios, and laboratories.

The CDR-7035 Cinema Digital Reader is installed on the projector, or penthouse of the motion picture film projector, and reads the digitized sound-track that has been written to the film. The Reader can perform scanning and decoding functions on both 35mm and 70mm motion picture film sizes. The signal output of the Reader is directed to the CDP-1000 Cinema Digital Processor for processing and conversion to analog signals to drive the auditorium speakers.

Error-correction circuits in the CDP-1000 Processor automatically adjust for any imperfect travel of the film (side-to-side weave, fore-and-aft movement, and up-and-down motion), imperfections on the film sound track (dust, blurs, etc.), and film splices. The resulting sound is free of hiss, pops, whistle, clicks and other extraneous noise. Only the sound that was recorded and mixed by the film maker in the sound studio is delivered to the auditorium sound system.

The translated (digital-to-analog) output of the Processor is directed to the house amplifiers and speakers for the enjoyment of the most critical listener - the audience.

Note:

- The CDP-1000 Cinema Digital Processor is completely compatible with theaters having Dolby® or other sound equipment that meets THX® standards.
- If desired, the digital data produced by the Processor can be applied to an external optional equalizer before digital-to-analog conversion of the sound data. One Processor can handle the outputs from two Readers, if desired.

MODEL CDR-7035 READER

The Reader (see figure 1-1) can be used with nearly any 35mm and/or 70mm theater projector. It is designed for easy installation on the top of the penthouse of the projector. Adapters are available from Optical Radiation Corporation to provide the necessary mechanical interface between most motion picture projectors in use. In the case of the Optical Radiation Corporation Century Projector line, the Reader can be installed directly on the projector penthouse, without the need of any special adapters.

The pathway for the motion picture film through the reader is shown in the threading diagram on the CCD camera unit of the Reader (also see figure 2-3).

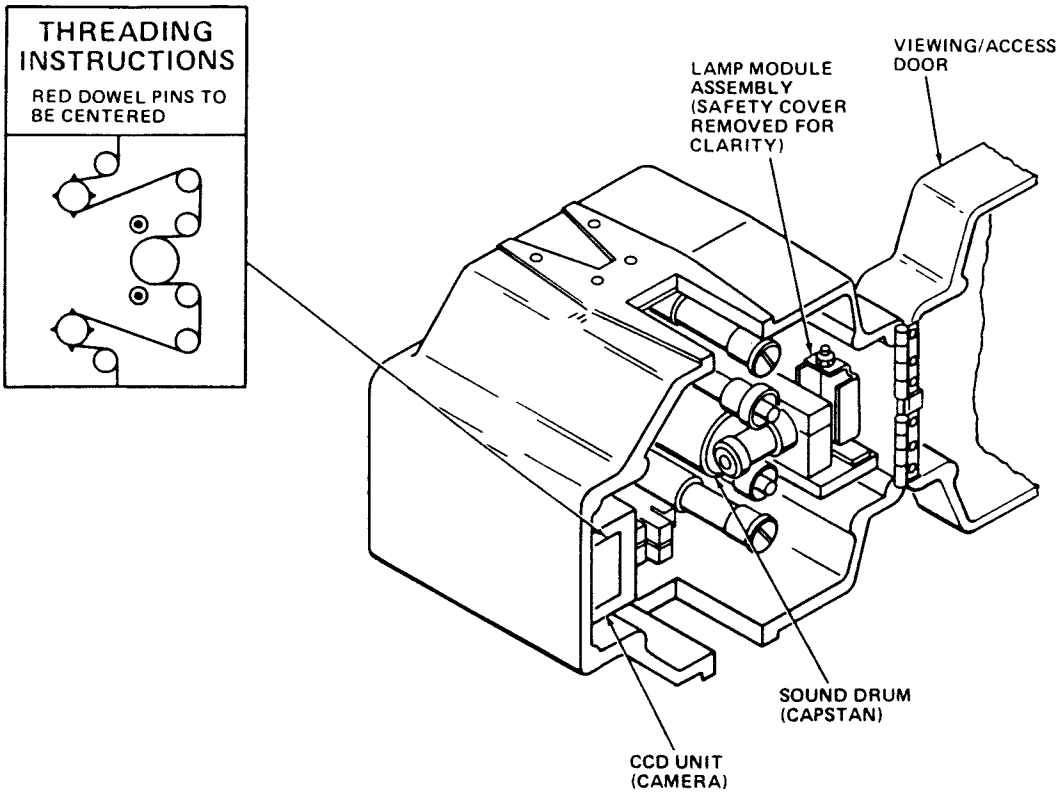
Note: In those cases where the projection room overhead clearance is insufficient, the Reader may be installed off the projector in a suitable position located between the projector penthouse and the film supply reel. The distance (film length) between the reader and the projector optical center must be a minimum of 25 frames to a maximum of 60 frames.

The Reader consists of a film-transport system of sprockets, guides, rollers, and strippers which guide the incoming motion picture film through the Reader Optical Bench. The Optical Bench consists of a quartz halogen lamp, a Charge-Coupled-Device (CCD) camera unit and the necessary optics, all mounted on a base to maintain the factory-adjusted optical alignment. The quartz halogen lamp is a component of a special, factory-pre-focused and wired lamp module assembly which is replaced as a single unit. The Optical Bench may be quickly and easily adjusted to accommodate either 35mm or 70mm motion picture film.

MODEL CDP-1000 PROCESSOR

The Processor (figure 1-2) may be mounted in a standard 19-inch electronics rack or on a suitable shelf or table. The Reader is electrically interconnected to the Processor by means of three cables. The Processor is connected to the existing sound amplifiers and speakers of the theater by up to six interface cables at the AUDIO OUTPUT receptacles on the rear of the Processor housing.

If an external equalizer (digital) is to be used with the Processor, an optional equalizer interface card (printed-circuit board) is installed in the Processor. The digitized data between the external equalizer and the interface card is carried over a flat, multi-conductor cable. The receptacle for the equalizer cable is on the back of the Processor, just below the audio input and output receptacles.



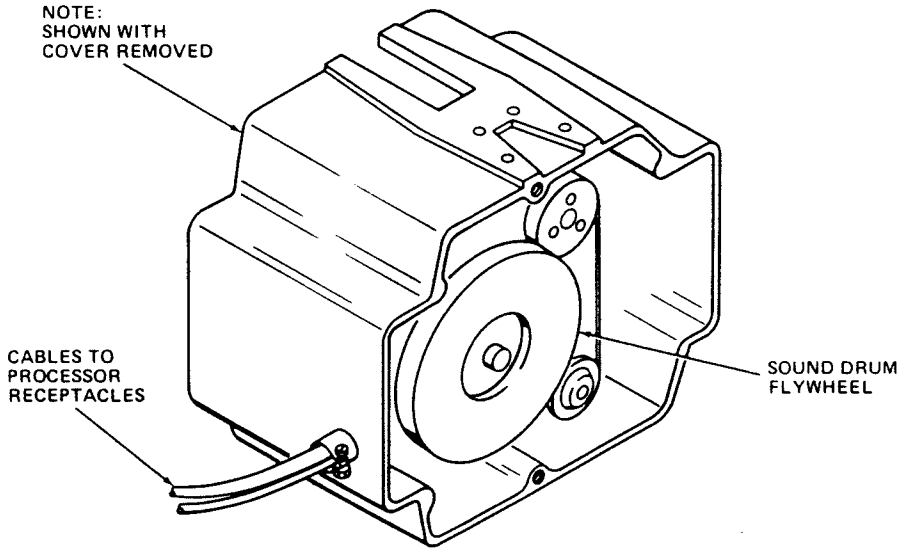


Figure 1-1. CDR-7035 Reader

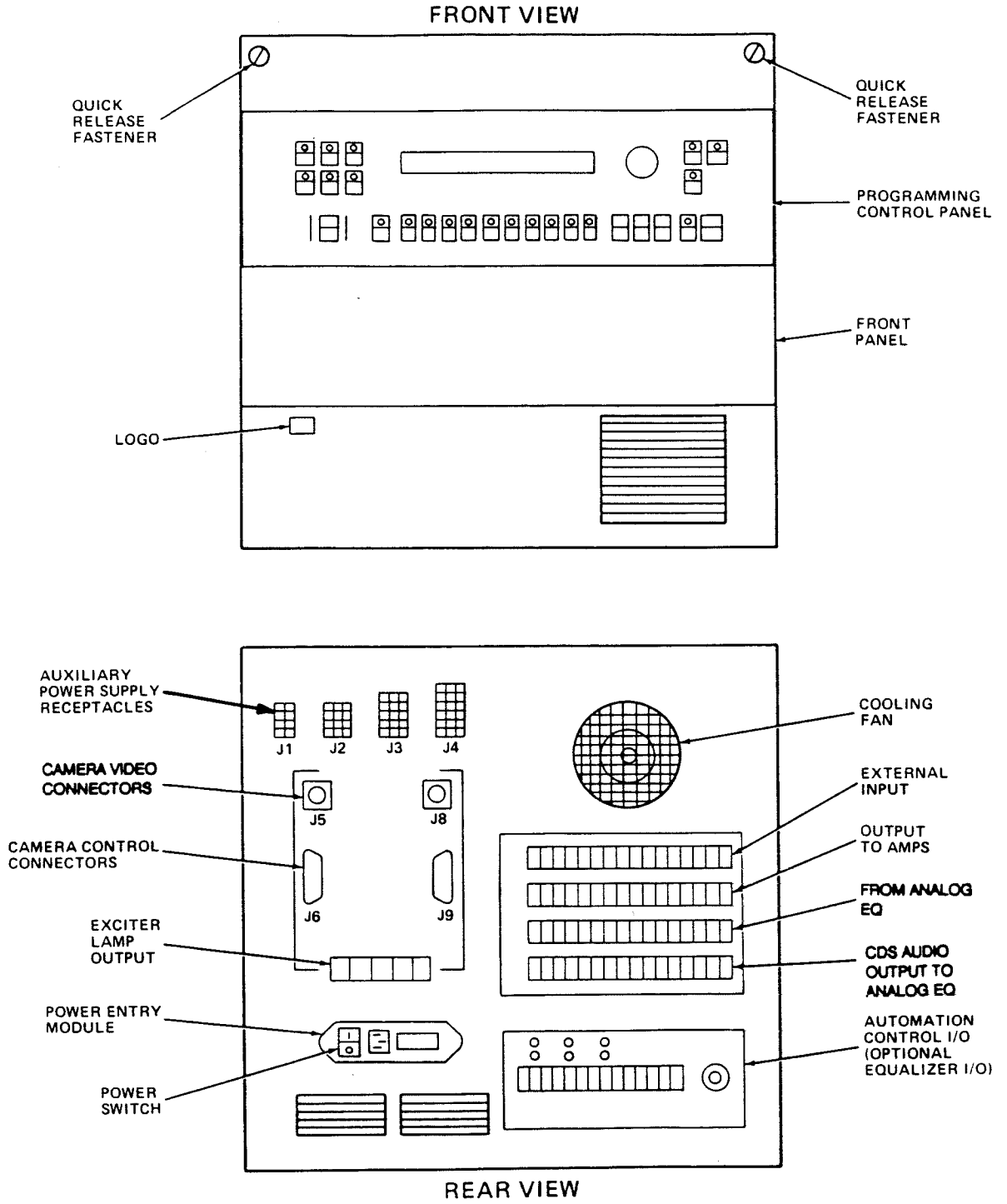


Figure 1-2. CDP-1000 Processor

If the Processor is to coexist with a non-digital sound system (i.e., Dolby, SVA, etc.), the audio output of the non-digital system is connected to the AUDIO INPUT connectors on the back of the Processor. In the digital (CDS) mode, the non-digital sound system will be automatically switched off by internal relays in the Processor. In the non-digital or power-down modes the CDS system will be automatically switched off, and the non-digital system will be automatically connected to the theater sound amplifiers.

The hinged front panel of the Processor contains the Programming Control Panel. Turning the two quick-release fasteners at the top of the processor one-quarter turn counter-clockwise releases the front panel. It may then be swung down, providing access to the interior of the Processor.

The 100/120/220/240-volt switchable power entry module is located on the rear of the Processor. The on/off switch for the Processor is located on the left side of the module housing. The on and off positions of the switch are indicated by the symbols "|" (on) and "O" (off). The receptacle for the Processor power cable is located adjacent to the on/off switch.

The power entry module includes a fuse block and a voltage selector card, located in the module housing, and protected by the module cover. The four small holes in the cover are used in conjunction with the white indexing pin on the voltage selector card to indicate the voltage at which the power entry module has been set (100, 120, 220, or 240 volts). The fuse block can be configured for either European Style fusing or North American Style fusing.

FRONT PANEL CONTROLS

Controls for programming the CDP-1000 are located on the control panel on the front of the Processor. The control panel is electrically connected to a "LOCAL" RJ-45 type telephone mini-modular jack in the Processor. An auxiliary control panel can be connected to the "REMOTE" jack in the Processor for use in the theater auditorium or other location. All Processor control functions are available at the auxiliary control panel for complete remote control of the CDP-1000. The "LOCAL" and "REMOTE" RJ-45 jacks are accessible when the front hinged front panel is opened (figure 1-2).

The Front Panel consists of a two-line by forty-character liquid-crystal-display (LCD), a row of buttons under the LCD Display, and a scroll knob. Seven of the ten buttons under the LCD Display control the operation of the system. The remaining three buttons are not used. (Refer to **Section 2 - OPERATING INSTRUCTIONS** for detailed descriptions of the controls.)

Section 2 - OPERATING INSTRUCTIONS

CONTROL AND INDICATORS

All operating controls and indicators are located on the Processor. The main power switch is located on the power entry module on the rear of the Processor (see figure 2-1). The control panel is located on the front of the Processor (see figure 2-2).

Power Entry Module

The 100/120/220/240-volt switchable power entry module is located on the rear of the Processor. The on/off switch for the Processor is located on the left side of the module housing. The on and off positions of the switch are indicated by the symbols "|" (on) and "**O**" (off). The receptacle for the Processor power cable is located adjacent to the on/off switch.

Note: Whenever the Processor main power switch is on, the quartz halogen lamp in the Reader will be illuminated.

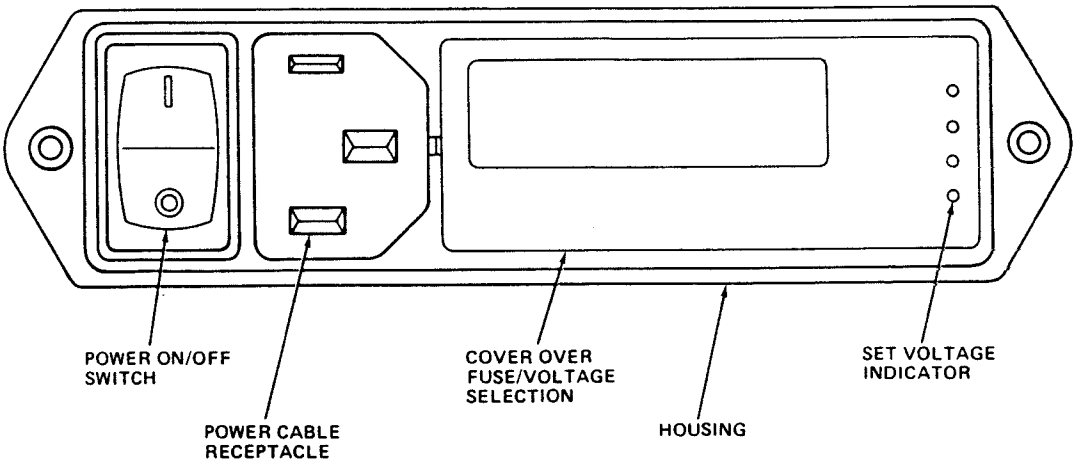


Figure 2-1. Power Entry Module

Control Panel

The control panel (figure 2-2) includes the two-line by forty-character liquid-crystal-display (LCD), the pushbuttons below the LCD, the **SELECT**, **SCROLL**, and arrow buttons, and the **VOLUME CONTROL** knob. The pushbuttons illuminate when active.

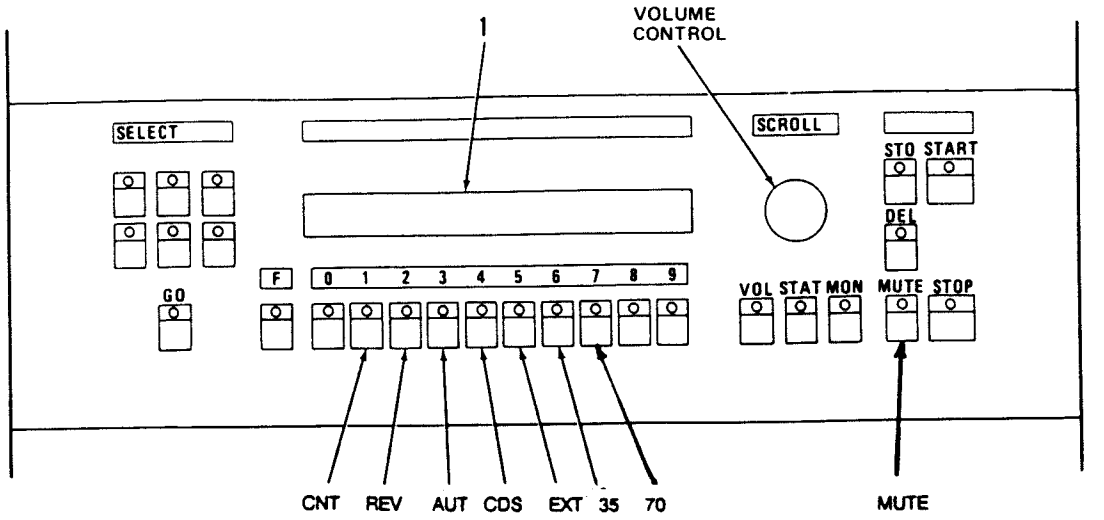


Figure 2-2. Programming Control Panel

USER MENU

Button Assignments and Definitions (figure 2-2)

SCROLL		Master Volume Control (level shown on display) Turn clockwise to increase master volume 1 dB; turn counterclockwise to decrease master volume 1 dB
1	**Cnt**	Error Count Menu
2	**Rev**	Selects software revision level menu
3	**Aut**	Selects automatic switchover of audio outputs
4	**CDS**	Use to manually select the CDS audio output to the output amplifiers Lights when CDS sound is detected
5	**Ext**	Use to manually select external inputs (Dolby, etc.) to be routed to output amps. Lights when CDS sound is no longer detected
6	**35**	Selects 35mm sound-to-picture synchronization delays
7	**70**	Selects 70mm sound-to-picture synchronization delays

The first line of the display (figure 2-2) either provides information about a system setting or shows the available menu selections. If one of the menu selections has a blinking cursor on its first letter, the operator can use the arrow buttons or the scroll knob on the control panel to move the cursor. Pressing the **SELECT** button will select the menu item. The second line of the display labels the function of each of the active buttons on the control panel.

Ten buttons (**0-9**) under the display control the operation of the system. Buttons **0-2** are software programmable, i.e., the function of the button will change depending upon which menu is displayed. Buttons **3-7** are dedicated to automation selection functions. The functions of the buttons are shown in the second line of the display.

The **SCROLL** knob either changes the value of a system setting or moves the cursor to the next soft-label on the display. The difference in modes is discernable by looking for a cursor on the display. If the cursor is visible, the **SCROLL** knob can be used to move the cursor. If the cursor is not visible, turning the **SCROLL** knob will increment or decrement the displayed parameter.

OPERATING PROCEDURE

Normal operation of the CDS system consists simply of threading the motion picture film through the Reader and positioning the main power switch on the Processor to "|" (on). When the projector is started, the program can proceed without need for other than routine attention by the operator.

Details of these operating steps are as follows:

1. Check that the main power switch (see figure 2-1) is positioned to "**O**" to turn off the Processor and Reader.

2. During initial startup, make sure that the correct size fuse and supply voltage range has been selected on the power input module (refer to **Section III - OPERATION** and **Appendix I -SPECIFICATIONS** for details).

3. Thread the motion picture film through the Reader (refer to **THREADING FILM THROUGH THE READER**, page 2-7).

4. Check that the red dowel pin indicators (shown in figure 2-3) are centered in the two damper arms. If the red dowel pins are not centered, it will be necessary to stop the program and increase or decrease the length of the loop of film between the upper and lower sprockets so as to center the red dowel pin indicators.

5. Position the main power switch on the Processor to "|" (on).

Power Up Display

When the system is first turned on, the Power Up Display shown below will appear on the LCD screen. This information will continue to be displayed until communications are established between boards within the Processor.

```
Starting Cinema Digital Sound System
Please wait...
```

Power Up Display

MENU NAVIGATION

Use buttons **0**, **1** and **2** to move through the various menus displayed on the LCD. These three buttons change function, depending upon which menu is displayed, but the method of navigation through the menus remains the same.

Selecting Menus

There are three different methods for selections a menu:

1. Pressing a soft-label button
2. Selecting a soft-label on the first line of the display menu
3. Password entry

```
Volume level: +0 dB
  Cnt Rev Aut CDS Ext 35 70 (Proj1)
        |
        Prev FP DSP
        Sel < > Aut CDS Ext 35 70 (Proj1)
```

Operator & Information Menus

The figure above is an example of menu selection from the Operator Menu. Pressing the button labeled **Rev** enters the Revision menu directly. Once in the Revision menu the cursor will be blinking on the Prev soft-label in line 1. The first soft-label is *always* **Prev** to return to the previous menu. Next to **Prev** are additional soft-labels. Rotating the scroll knob or pressing the left or right arrow buttons moves the cursor to different soft-labels. The **Sel** button selects the menu of function that the cursor is on.

Notice in the figure that after pressing the **Rev** button the labels change above the buttons (except for the automation buttons). Pressing **Sel** with the cursor on **Prev** returns to the previous menu. Moving the cursor to one of the other soft-labels and pressing **Sel** enters a new menu.

Automation Controls

Buttons **3-7** control and indicate the state of the automation system. These button labels are always displayed regardless of the menu selected. The button LEDs show the automation state of the CDP-1000.

The state of the system is always enunciated by the LEDs in each of the automation buttons. If the system is in automatic **CDS/Ext** detection the **Aut** LED will light and either **CDS** or **Ext** depending on the type of film being projected. **CDS** only lights when actual digital sound is detected by the reader. When **CDS** or **Ext** lock modes are active the **Aut** LED will not light. The **35** or **70** LED will light depending on the currently selected sync delay. To the right of button **7** is an information message showing the currently selected projector. There is no button associated with this message. All projector switching is accomplished through the projector automation inputs on the back panel.

Confirmation of Automation Selections

All selections of buttons **3-7** requires confirmation before a mode is accepted. When a button is pressed it and the **Go** button's LED will blink. Pressing **Go** will cause the selection to take effect. Pressing the blinking mode button will cancel the selection.

Automatic Selection of CDS/Ext

Button **3**, labeled **Aut**, selects and indicates automatic detection and selection of digital or analog (SVA) film. This detection and selection is performed by the DSP board within the CDP-1000 unit. Both the **Aut** and **CDS** LEDs will light when a digital film is detected else **Aut** and **Ext** will light.

Locking the System to CDS Output

Button **4**, labeled **CDS**, will lock the DSP in the CDS mode and ignore attempts to switch to the External inputs. The **Aut** LED will not light in this mode.

Locking the System to External Sound

Button **5**, labeled **Ext**, locks the DSP to external sound inputs and ignores any attempts to switch to the CDS mode. The **Aut** LED will not light in this mode.

Selecting 35/70 Sync Delays

Button **6**, labeled **35**, selects the 35mm sync delays. Button **7**, labeled **70**, selects the 70mm film delays.

Operator Display and Menu

The normal display (see above figure) shows the volume level and has buttons to display the error counts and software revision levels. The volume is adjustable within the range of +6dB to -10dB from the reference level (more later).

Volume Adjustment

The projector operator can adjust the volume level through the range of +6dB to -10dB. Levels outside of this range requires access to the Setup menu and a change to the reference level.

Muting

Not part of any menu. All sound can be muted by pressing the **Mute** button just to the right of the volume knob. The LED will blink indicating that muting is enabled. Pressing the button again will unmute the sound and turn off the LED.

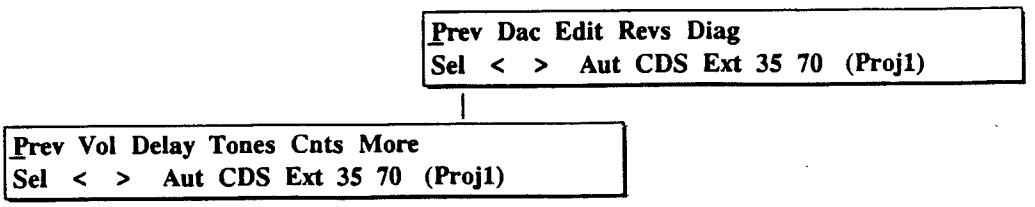
Error Counts

Pressing the **Cnt** button selects the Error Count menu. Within this menu the operator can get error counts to judge the condition of the print. **Zero** will zero the error counts. The diagnostic counts, **CntA** and **CntB**, accumulate error information and should be zeroed before projecting a film to accumulate a meaningful total. This total is also required when reporting error to Optical Radiation.

Software Revision Menu

The Software Revision menu displays revision level information of the Front Panel and DSP board. These revisions are required when reporting system errors to Optical Radiation.

Setup Menu



Setup Menus

All system adjustments are available from the Setup menus. Because of its importance Setup is only accessible by password. This prevents unauthorized changes that can disturb the reference levels and delays. In other words, access should be limited to knowledgeable individuals. As the password entry is not foolproof, once reference levels have been established the settings should be recorded in case of unauthorized changes. Refer to **Appendix IV - PASSWORD PROCEDURE** for details on the password procedure.

The Setup menus provide for setting room reference levels, channel levels, film to picture delays, DAC6 configuration and diagnostics. The CDP-1000 can also generate reference level tones and noise for measuring sound pressure levels.

The Setup menus are provided on two display pages as shown above. The first page includes the most-used selections. The second page of the Setup menus is reached by selecting the soft-label **More** on the first page. The sub-menus are described in detail in **INSTALLATION ADJUSTMENTS** in **Section 3 - INSTALLATION** in the paragraph titled **System Setup** (page 3-22).

THREADING FILM THROUGH THE READER

Thread the motion picture film through the Reader as follows (see figure 2-3 and the threading diagram that is affixed to the CCD camera unit in the Reader):

1. Open the viewing/access door on the side of the Reader.

2. Check the interior of the Reader for cleanliness. Remove any foreign matter, dust, film bits, etc. Clean any dirt or debris from the optics of the Reader in the same manner as when cleaning the optics in the projector.

3. Clean the Sound Drum with dry, lint-free cloth. Remove all particulate matter. Employ alcohol after five showings or once a day.

4. Check that the Reader Optical Bench is configured for the particular film size to be used. If the configuration is not correct for the film size to be used, refer to **Appendix III - READER ADJUSTMENT FOR FILM SIZE.**

    - o For 35mm film, the Optical Bench will be installed flush to the rear housing wall.

    - o For 70mm film, the three pivot blocks will be placed between the Optical Bench and the rear housing wall to position the CCD camera unit and the quartz halogen lamp to read the digital sound track on 70mm film.

5. Open the film path over the sprockets by rotating both of the "35-70" pad rollers (see figure 2-3) to their neutral positions (neither the **35** or **70** pad roller will touch the related film sprocket).

6. Thread the film through the Reader as shown on the threading diagram and figure 2-3.

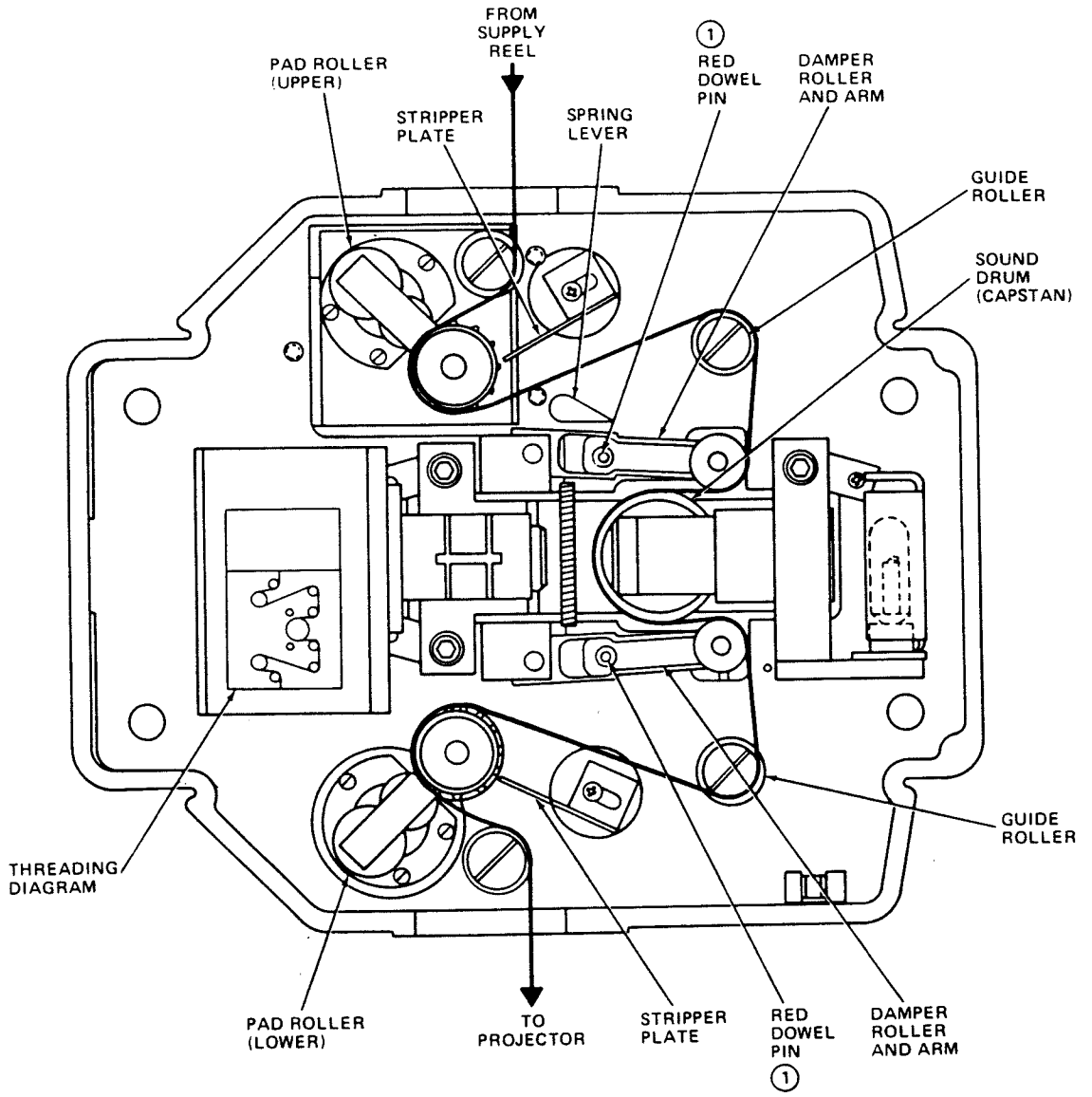
7. Rotate the two "**35-70**" pad rollers so as to place either the **35** or **70** roller (depending upon which size film is being used) against the top and bottom film sprockets. Check that the film perforations are securely engaged in the sprocket teeth.

   CAUTION: ROTATING THE "35-70" PAD ROLLERS THE WRONG WAY CAN DAMAGE THE FILM.

8. Check that the red dowel pin indicators (shown in figure 2-3) are centered in the two damper arms. Increase or decrease the length of the loop of film between the upper and lower sprockets as necessary to center the red dowel pin indicators.

   Note: "Centering" of the red dowel pin indicators in the preceding step is important in the vertical direction only; the indicator may be slightly above or below the actual center of the hole in the damper arm.

9. Close the door of the Reader.



NOTE: ① RED DOWEL PINS (INDICATORS) MUST BE CENTERED.

Figure 2-3. Threading Film Through Reader

OPERATOR MAINTENANCE

Maintenance of the Model CDP-1000 Cinema Digital Processor and CDR-7035 Reader is primarily limited to:

Processor:

- Periodically check all cabling to and from the Processor for loose or broken connectors.
- Remove any dirt and foreign materials from the exterior of the cabinet of the Processor.
- Wipe the display screen on the Processor with a lightly dampened cloth; do not use window cleaner or solvent to clean the LCD.
- Check the air intake grille on the rear and bottom of the Processor cabinet for the cooling fan. Remove any materials that might block the grille and prevent adequate airflow through the Processor.

Reader:

- Open the access door on the side of the Reader, and remove any foreign material and dirt from the Reader housing.
- Keep the rollers and sprockets clean and free of dirt, foreign matter, and other material that might interfere with smooth operation, obstruct the path between the CCD camera unit and the lamp module, or damage the film.
- If the lamp module light output drops below a useable level, replace the lamp module as instructed in **Replacing Reader Lamp Module Assembly** (page 2-11). (See figure 2-4).
- Periodically check all cabling to and from the Reader for loose or broken connectors.
- Clean the sound drum daily with isopropyl alcohol without leaving applicator residue. (It is recommended that individually sealed towellettes be used. Discard the used towellettes.)

Note: No lubrication of the Reader is required or desired.

Replacing Reader Lamp Module Assembly

The quartz halogen lamp in the Reader has an expected life of approximately 2000 hours. If the lamp fails, replace the complete lamp module assembly as follows (see figure 2-4):

Note: When replacing the Lamp Module Assembly, use only Optical Radiation Corporation Part No. 909089-001.

1. Position the POWER switch on the Processor to "O" (OFF).

2. Open the access door on the side of the Reader.

3. Unplug the lamp module assembly electrical connector from the receptacle on the Reader housing.

4. Allow the lamp module assembly to cool, if hot. Then, remove the outer safety shield.

5. Remove the two screws securing the lamp module assembly to the optical bench, and carefully pull downward on the lamp module assembly to remove it from its locating pins on the optical bench.

6. Install the replacement lamp module assembly on the optical bench, making sure that the locating pins align easily and smoothly. Install the two screws removed in step 5.

7. Connect the plug from the replacement lamp module assembly to the receptacle on Reader housing. Make sure that the plug is firmly seated in the receptacle.

8. Install the safety shield removed in step 4. Make sure that the safety shield is installed before applying power.

9. Close the Reader access door.

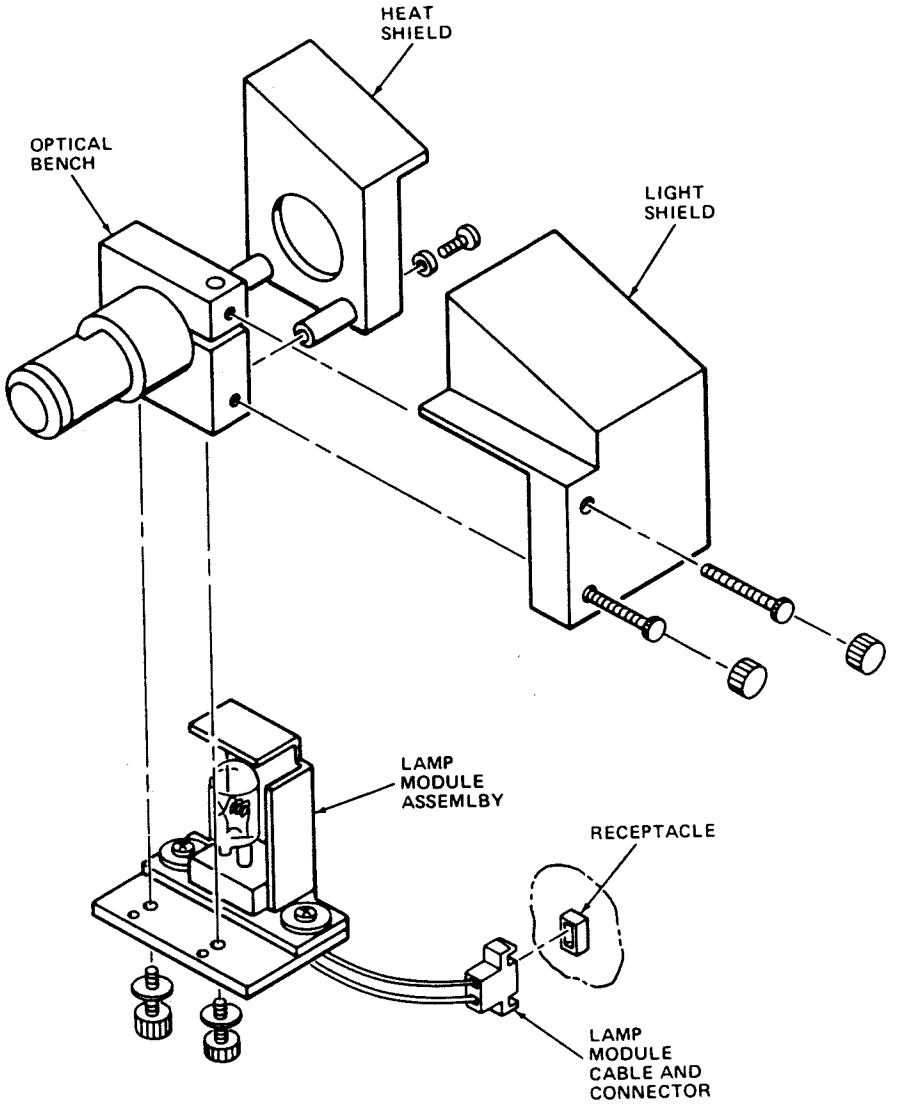


Figure 2-4. Replacing Lamp Module Assembly

CLEANING

Clean the surface of the Reader sound drum with isopropyl alcohol with a lint-free applicator.

Periodic cleaning of the components of the system is not required unless the equipment is being operated in an unusually dirty environment. When necessary, wipe the exterior of the Processor and Reader with a clean, lint-free cloth.

Dirt on the reader lens in the Reader may result in some loss of sound quality. Clean the glass items in the Reader in the same manner and with the same materials that are used to clean the lenses and projection lamps of the projector.

CAUTION: Do not use non-approved film cleaners on film containing a Cinema Digital Sound (CDS) sound track. Such non-approved cleaners include abrasive materials, brushes, and other materials that may produce scratches and other "readable" defects on the sound track.

TROUBLESHOOTING

TROUBLE	PROBABLE CAUSE	SUGGESTED REMEDY
CDP-1000 Processor and CDR-7035 Reader completely inoperative	POWER switch on Processor not positioned to "|" (ON).	Position POWER switch to "|" (ON; out of "O" position)
	Fuse blown	Replace fuse (refer to **Appendix I** for the proper fuse size)
CDP-1000 Processor and CDR-7035 Reader inoperative (continued)	External AC line not connected to Processor	Connect external AC line to power input module on rear of Projector
	Lamp module in Reader defective	Replace the lamp module as instructed on page 2-11
	One or more cables from Reader to Processor disconnected or defective	Repair connection or cable as may be necessary
	Defective CCD camera unit in Reader	(Qualified technical maintenance required)

Section 3 - INSTALLATION

GENERAL

Installation and Initial Setup of the Model CDP-1000 Cinema Digital Processor and CDR-7035 Reader requires only those tools and skills possessed by experienced and competent projection equipment maintenance personnel. (Refer to **Appendix I - SPECIFICATIONS** for a list of test equipment recommended for use when adjusting Reader lamp voltage and during theater equalization procedures.) After the installation and initial equalization, there are no routine or periodic maintenance procedures or adjustments required.

During the preparation for installation, refer to figure 3-1 for channel assignments to be found in a typical auditorium. See figure 3-2 for a simplified block diagram of the Model CDP-1000 Digital Sound Processor system for basic system technical reference. See figure 3-3 for detailed interconnecting cabling.

Note: Refer to **Appendix II - CABLE AND CONNECTOR SPECIFICATIONS** for detailed interconnecting cable data, including wire sizes and connector types.

CAUTION: Before beginning installation of the Model CDP-1000 Digital Sound Processor and CDR-7035 Reader, turn off all equipment power in the projection booth. The power switch on the Processor should be in the "O" (off) position.

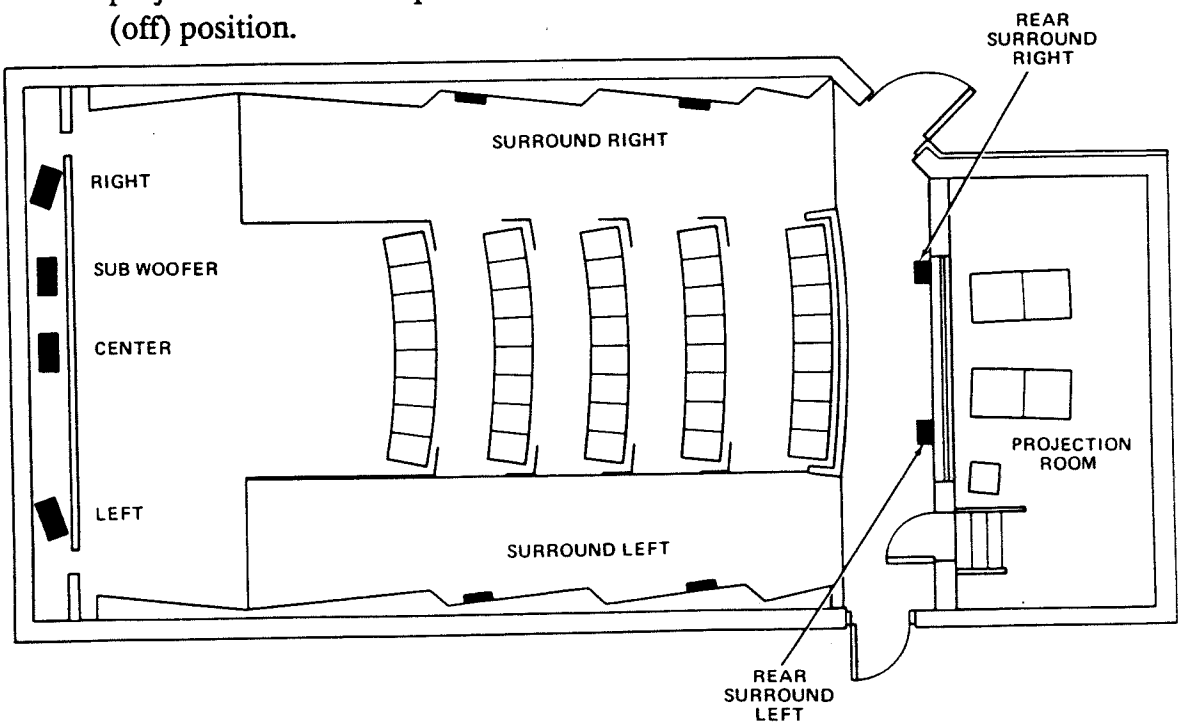


Figure 3-1. CDS Channel Assignment

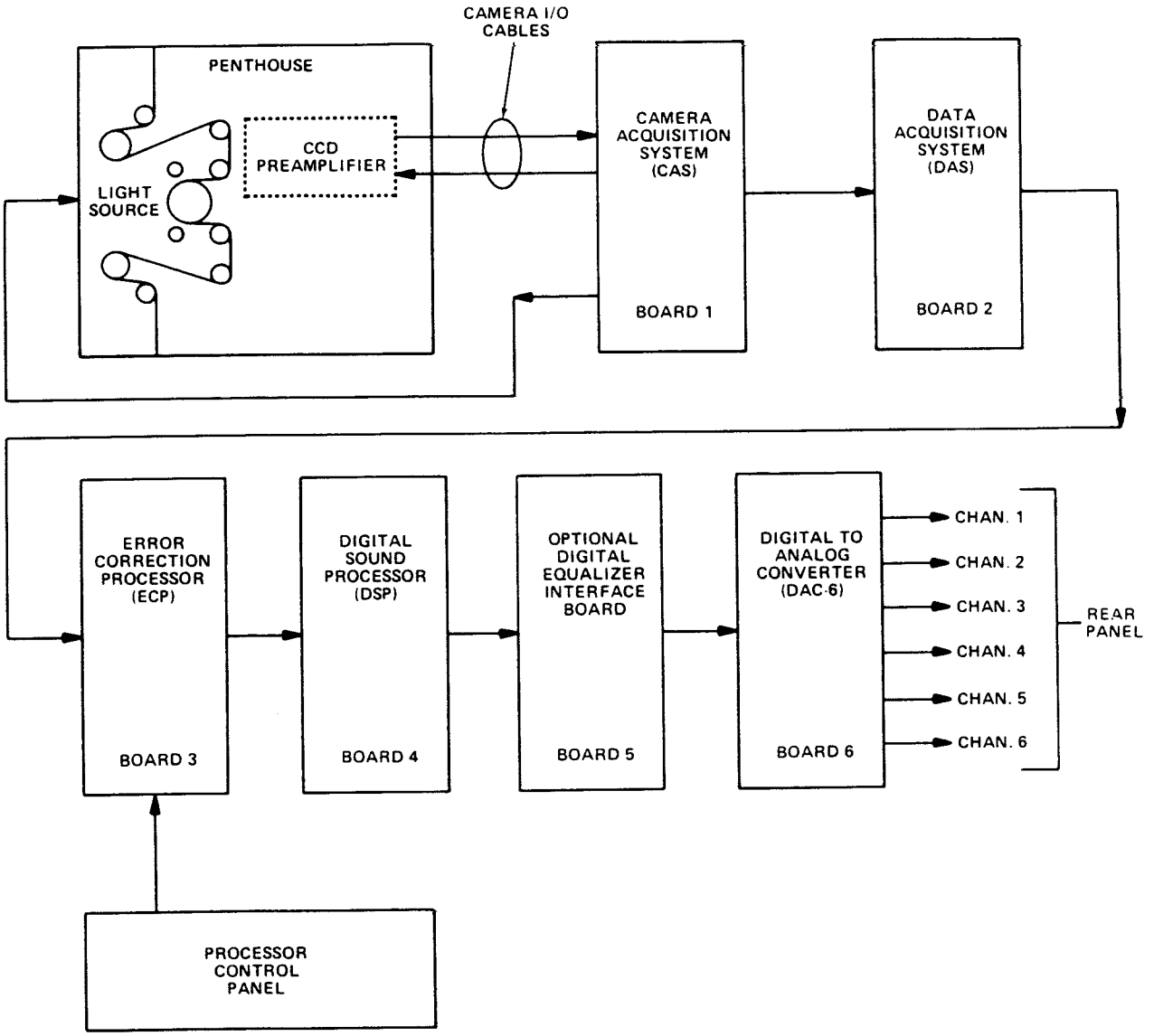


Figure 3-2. Block Diagram - CDS System

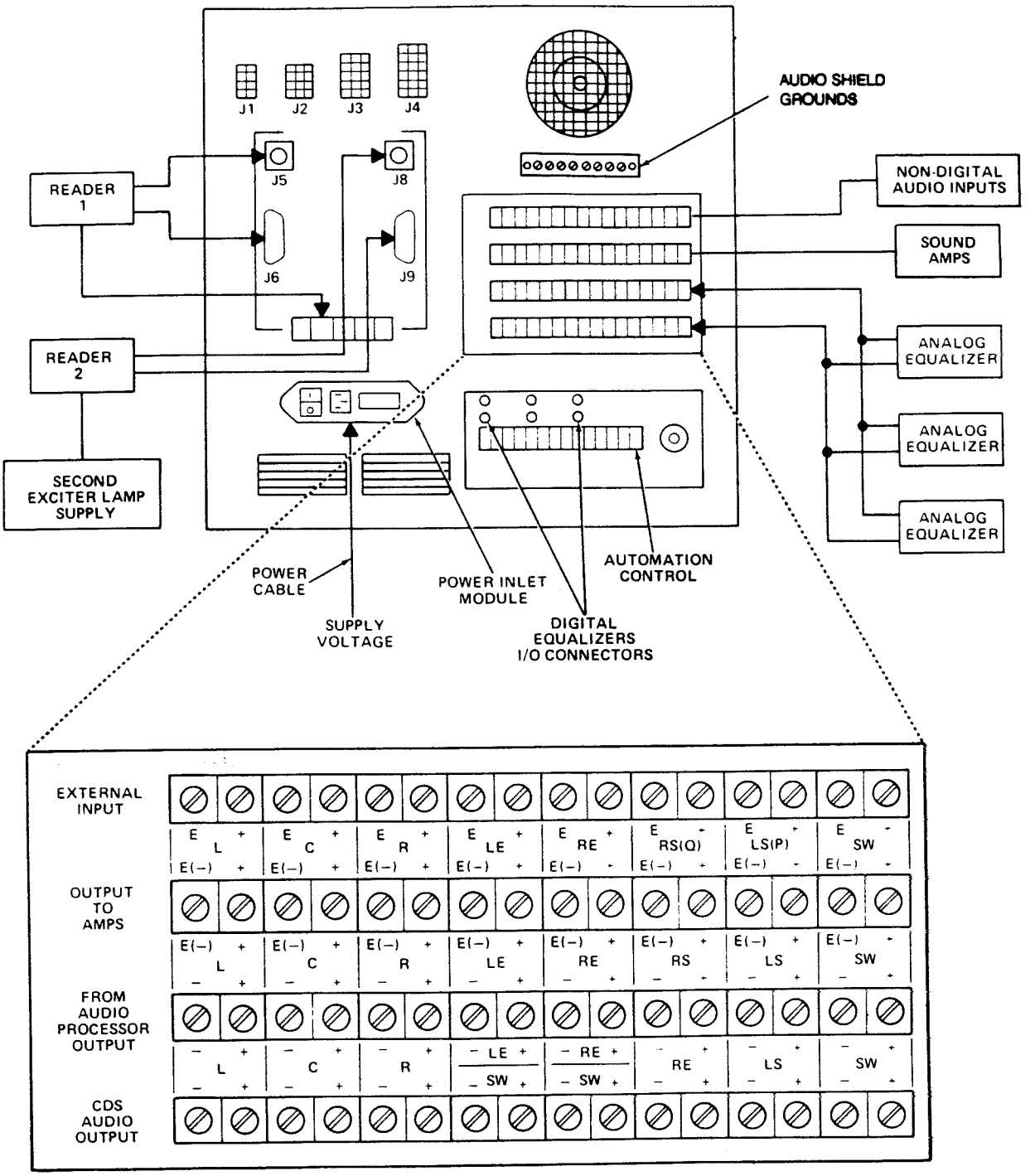


Figure 3-3. Interconnecting Cabling Diagram

INSTALLATION OF THE PROCESSOR

Rack or Shelf-Mount Installation

The CDP-1000 Processor is designed for installation either in a standard 19-inch rack assembly or on a suitable table, shelf, or cabinet. The bottom of the Processor cabinet has four rubber feet for stand-alone installation on a table, shelf, or cabinet.

1. To install the Processor in a rack, use eight No. 10-32NF screws (½ or ¾ inch long, as may be required).

   a. Make sure that there is adequate air space at the rear and bottom of the Processor for the cooling air. There should be at least 3 inches clearance for the rear air inlet grille and 1 ½ inches clearance for the bottom inlet grille.

   b. Make sure that there is adequate room for access to the power inlet module on the back of the Processor (see figure 3-3).

   c. Make sure that there is clearance for the cabling that will be connected to the receptacles on the rear of the Processor.

Supply Voltage Selection:

The Model CDP-1000 Digital Sound Processor and CDR-7035 Reader are designed for operation from a 100 Vac, 120 Vac, 220 Vac, or 240 Vac, 50-60 Hz, single-phase, 480 volt-ampere source. The power entry module on the Processor (see figure 3-4) provides the means for input voltage selection. Check the AC line voltage and adjust the setting of the power entry module (if necessary) as follows:

Note: A supply line voltage variance within +5%, -10%, is tolerable.

1. Measure the external voltage source (wall outlet supply) voltage.

2. The selected operating voltage of the power entry module is indicated by a white indexing pin on the right side of the module. The white index pin will be in the cover plate hole corresponding to the set voltage for the module: "100 V", "120 V", "220 V", or "240 V". If the displayed set voltage is correct, no voltage adjustment will be necessary. If the displayed set voltage does not agree with the local supply voltage, proceed as follows:

b. Using a small blade screwdriver or a similar tool, open the cover of the power entry module (see figure 3-4). Insert the tool in the small opening on the left side of the cover, and wedge the cover off of the power entry module housing.

c. The cover includes the fuse block assembly (see figure 3-4). Set the cover/fuse block assembly aside.

d. Using the white "T"-shaped indicator pin, pull the voltage selector card (a printed-circuit board), straight out of the power entry module housing.

e. Orient the voltage selector card so that the desired voltage is inserted first into the module (see figure 3-4). Orient the indicator pin so that it points out when the card is re-inserted into the module.

f. Insert the voltage selector card into the power entry module housing with the silk screened legend side of the card facing the three-prong connector and the edge containing the selected voltage going into the housing first. (See figure 3-4.)

g. Replace the cover in the power entry module housing, making sure that the white indicator pin aligns with the correct voltage hole in the cover.

h. Plug the power cable into the receptacle on the power entry module.

Fuses - Power Entry Module:

The power entry module accommodates fusing arranges for both European and North American style fusing. To change the particular fusing arrangement and to install replacement fuses, proceed as follows:

Note: Refer to **Appendix I - SPECIFICATIONS**, for fuse sizes and specifications.

1. Disconnect the power cord from the power entry module on the rear of the Processor (see figure 3-3).

2. Using a small blade screwdriver or a similar tool, open the cover of the power entry module (see figure 3-4). Insert the tool in the small opening on the left side of the cover, and wedge the cover off of the module housing.

3. Check the fuse block to see whether it is configured for North American or European fusing (see figure 3-4). If the fusing arrangement is correct for the particular location, proceed to step 4. Otherwise, proceed to step 3.a to convert to the European Fusing Arrangement, or to step 3.b to convert to the North American Fusing Arrangement.

   a. European Fusing Arrangement: If the fuse block is in the North American Fusing Arrangement, and it is desired to change to the European Fusing Arrangement:

      (1) Loosen the Phillips screw two turns, and remove the fuse block by sliding up, then away from the Phillips screw, and lifting up from the pedestal.

      (2) Invert the fuse block, and slide it back onto the Phillips screw and pedestal.

      (3) Compare the fuse block configuration with the "European Fusing Arrangement" illustration in figure 3-4. If correct, tighten the Phillips screw.

      Note: In the European Fusing Arrangement, two European fuses are required. Both fuses must be the same amperage as that called out in the specifications for the particular voltage selected.

   b. North American Fusing Arrangement: If the fuse block is in the European Fusing Arrangement, and it is desired to change to the North American Fusing Arrangement:

      (1) Loosen the Phillips screw two turns, and remove the fuse block by sliding up, then away from the Phillips screw, and lifting up from the pedestal.

      (2) Invert the fuse block, and slide it back onto the Phillips screw and pedestal.

      (3) Compare the fuse block configuration with the "North American Fusing Arrangement" illustration in View A of figure 3-4. If correct, tighten the Phillips screw.

4. Insert the correct size fuse into the fuse block, using 5 x 20 mm for European or 6 x 32 mm 3AG (¼ x 1¼) for North American. (Refer to **Appendix I -SPECIFICATIONS**.)

5. Replace the cover in the power entry module housing, making sure that the white indicator pin aligns with the correct voltage hole in the cover.

6. Plug the power cable into receptacle on the power entry module.

CAUTION:

- Do not use a ground-lifting adapter and ***NEVER*** cut the ground pin on the standard U.S.A. 3-prong plug or receptacle.
- Before turning the system "ON", make sure that the correct size fuse has been installed (step 4; also refer to **Appendix I - SPECIFICATIONS**).

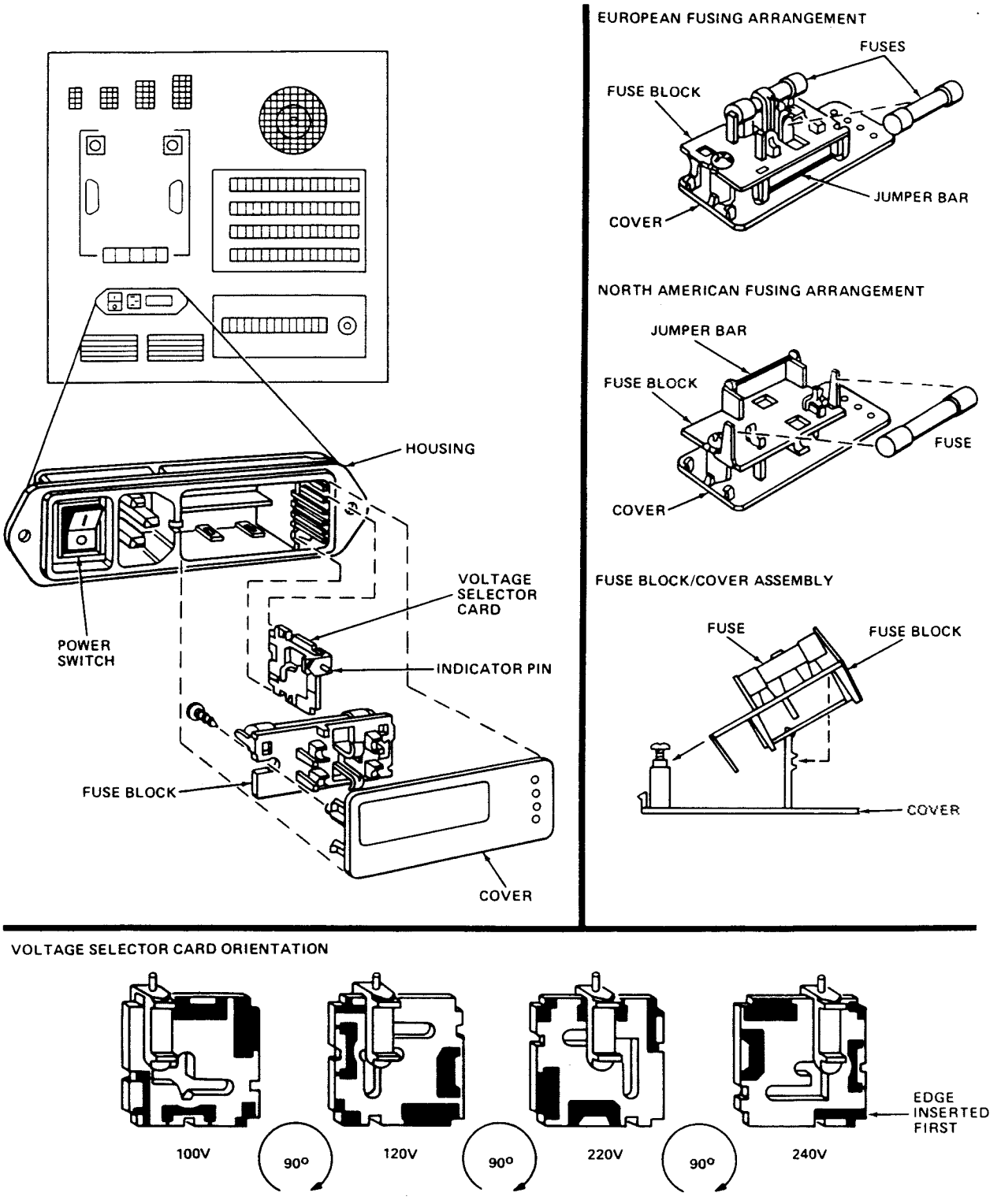


Figure 3-4. Voltage Selection - Power Entry Module

INSTALLATION OF THE READER

The Reader is designed for installation on a motion picture projector penthouse. There are four drilled-through mounting holes in the bottom and four threaded holes on the top of the reader housing. The hole patterns of these mounting holes mate with the existing hole patterns of the penthouse on all Century projectors. Various reader adapters (refer to LIST OF OPTIONAL EQUIPMENT in **Appendix I - SPECIFICATIONS**) are available to adapt the Reader directly to other projectors.

CAUTION:

- Use care when handling and installing the Reader to prevent damage to the Reader and lenses and the quartz halogen lamp module in the Reader.
- Use care to prevent damage to the rollers, roller arms, sprockets, and other components of the Reader when installing the attaching hardware through the bottom mounting holes.
- NEVER transport the reader with the flywheel installed.

Note: The Reader should be installed between the incoming film reel arm and the projector penthouse. If there is any auxiliary equipment installed between the projector penthouse and the incoming film reel arm, the Reader should be installed on top of the auxiliary equipment; i.e., between the auxiliary equipment and the incoming film reel arm or platter film guidance hardware.

Alternate Locations for the Reader. If there is inadequate headroom in the projection booth for installation of the Reader on the projector penthouse, the Reader may be installed on a suitable bracket, shelf, or other solid mounting place near the projector. The distance between the Reader and the projector shall not exceed 60 film frames (approximately 4 feet).

Installation of Reader on Projector: Install the Reader on the film projector housing as follows (See figure 3-5):

1. Remove the bolts that secure the incoming film reel arm or platter film guidance hardware to the projector (or any auxiliary equipment that may be installed on the projector housing), and remove the film reel arm or platter film guidance hardware.

   Note: Some projectors (such as Optical Radiation Corporation's Century projector) use four bolts to secure the film reel arm to the projector penthouse; other projectors may use only two bolts to hold the reel arm.

2. Check whether or not the mounting holes in the projector penthouse and the film guide reel mate with the corresponding mounting holes on the top and bottom of the Reader.

   Note: If the mounting holes on the particular projector penthouse and film reel arm do not mate with the mounting holes in the Reader, an adapter must be used between the Reader and the projector Penthouse and between the reel arm and the Reader. Contact your Optical Radiation Corporation Customer Engineer for the correct Reader adapter.

3. **Bypass Installation.** The CDS Reader Bypass Assembly (see figure 3-5) is used to bypass the reader when running a non-CDS encoded film. The two arms with rollers are mounted to the top and bottom blocks on the Reader so as to form a track for the film to thread in and out of the Reader section without passing through the Reader. The arm/roller sets may be mounted either towards the front or back of the Reader, as space may provide. (Additional information is provided in **Appendix 6 - PROJECTOR ADAPTER KITS.**)

4. If installing the Reader on a Century projector, or other projector penthouse with matching mounting holes:

   a. Place the Reader directly on the projector penthouse (or auxiliary equipment). Make sure that the interconnecting cables from the Processor to the Reader are not caught between the Reader and the projector or auxiliary equipment.

   b. Align the four mounting holes in the bottom of the Reader with the four threaded holes in the projector housing (or auxiliary equipment), and install new bolts through the Reader and into the projector housing (or auxiliary equipment). Tighten the bolts securely.

   c. Align the mounting holes in the bottom of the film reel arm with the threaded holes in the top of the Reader, and install the same size bolts as removed in step 1 through the film reel arm and into the Reader. Tighten the bolts securely.

5. If a Reader adapter is being used between the Reader and the projector penthouse (or other auxiliary equipment) and between the reel arm and the reader:

   a. Place the Reader adapter on the projector penthouse (or other auxiliary equipment).

b. Align the mounting holes in the Reader adapter with the mounting holes in the projector penthouse (or other auxiliary equipment, and secure the adapter with the furnished bolts. Tighten the bolts securely.

c. Place the Reader directly on the Reader adapter on the projector penthouse. Make sure that the interconnecting cables from the Processor to the Reader are not caught between the Reader and adapter, projector, or any auxiliary equipment.

d. Align the four mounting holes in the bottom of the Reader with the four threaded holes in the Reader adapter, and install the bolts that were removed in step 1 through the Reader and into the Reader adapter. Tighten the bolts securely.

e. Place another Reader adapter (if required) on top of the Reader. Align the mounting holes in the Reader adapter with the mounting holes in the Reader, and secure the adapter with the furnished bolts. Tighten the bolts securely.

f. Align the mounting holes in the bottom of the film reel arm with the threaded holes in the top of the Reader adapter, and install the same size bolts as removed in step 1 through the film reel arm and into the Reader adapter. Tighten the bolts securely.

6. Install the three interconnecting cables between the CDR-7035 Reader and CDP-1000 Processor as described in **"Reader to Processor Cables"** on page 3-16.

7. Adjust the Reader for the size of motion picture film (35mm or 70mm) to be used as instructed in **Appendix III - READER ADJUSTMENTS FOR FILM SIZE.**

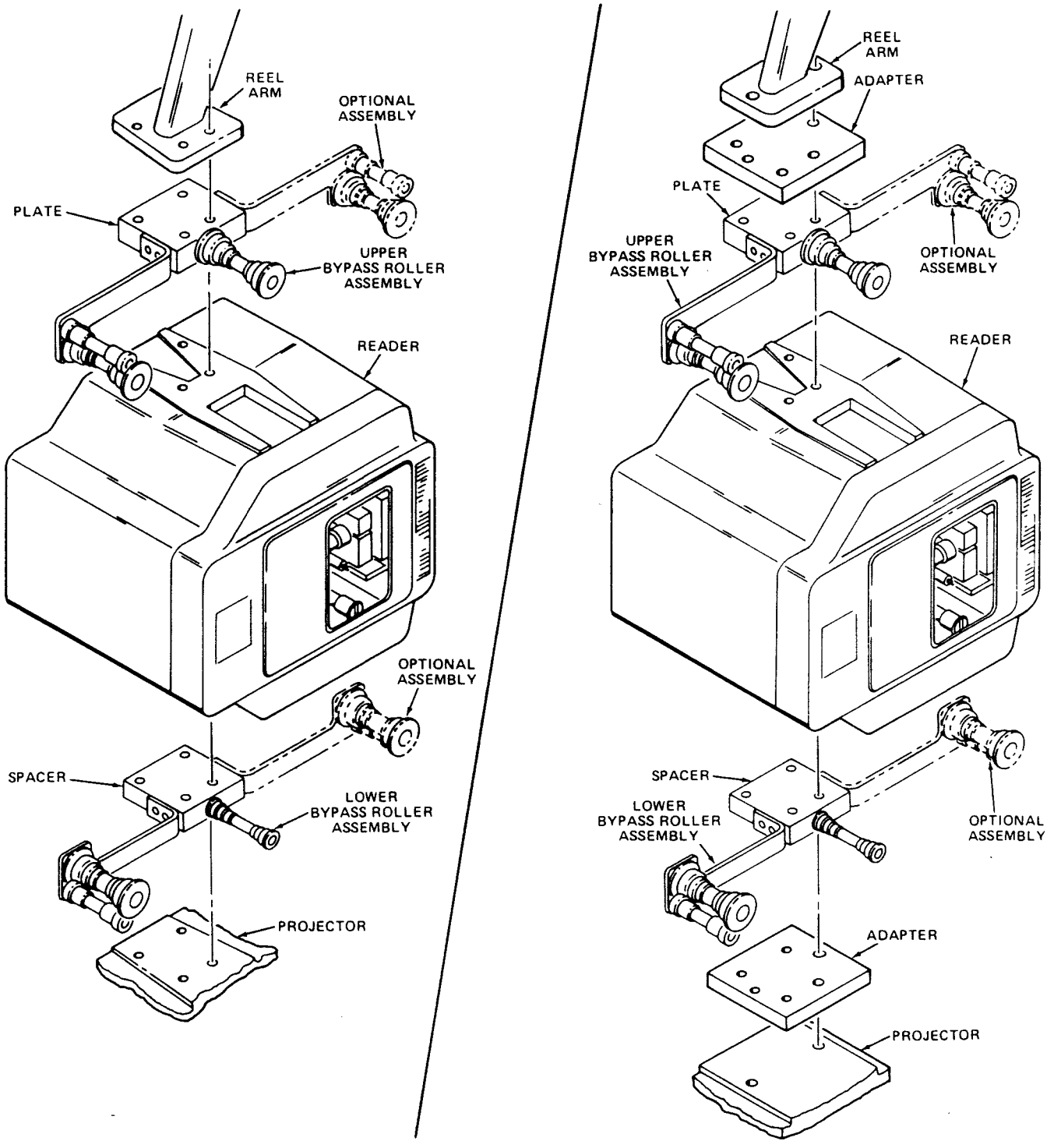


Figure 3-5. Installing Reader on Projector

INTERCONNECTING CABLES

All cable connections to the Processor are made to the receptacles on the rear of the Processor (see figure 3-6). These receptacles and their functions are as listed in the following tables:

REAR PANEL CONNECTORS

REF	NOMENCLATURE	FUNCTION
J1	(Optional Auxiliary Power Supply)	±8 Vdc
J2	(Optional Auxiliary Power Supply)	±18 Vdc
J3	(Optional Auxiliary Power Supply)	+5 Vdc
J4	(Optional Auxiliary Power Supply)	+15 Vdc, -5.2 Vdc, +12 Vdc
J5	CAMERA VIDEO	Video Signal In from Reader 1
J6	CAMERA CONTROL	Control Signals between Processor and Reader 1
J8	CAMERA VIDEO	Video Signal In from Reader 2
J9	CAMERA CONTROL	Control Signals between Processor and Reader 2
Barrier Strip	LAMP POWER	Excitation Voltage to Lamp Module in Reader 1 **Note:** Reader 2 requires additional external exciter lamp supply, Optical Radiation Corp. Part No. CDPS221 (see figure 3-3)

Note: The AUXILIARY POWER SUPPLY receptacles above are for use when it is desired to connect an external DC power supply to the Processor. The auxiliary power supply may be used as a backup and/or emergency power source.

EXTERNAL CONTROL SIGNALS

Proj1	Causes the Processor to switch from Camera 2 input to Camera 1 input on back panel when **IN** and **GND** terminals are shorted together.
Proj2	Causes the Processor to change-over to Camera 2 input when the **IN** and **GND** terminals are shorted together.
CDS	Causes the Processor to output digital sound to the theater amplifiers when the **IN** and **GND** terminals are shorted together.
EXT	Causes the Processor to allow the external audio source to pass directly to the theater amplifier outputs on the rear panel when the **IN** and **GND** terminals are shorted together.
Relay Enable	A TTL control signal which is used by external relay equipment to direct signals during different modes of operation. A TTL "low" (referenced to "Relay Gnd") occurs on this terminal when the CDS Processor desires to output CDS sound.
+5 Vdc	Available power source for external relays. (1 ampere maximum.)

Note: **Proj1, Proj2, CDS** and **EXT** inputs must be held shorted to ensure continuous selection of each respective function.

AUDIO INPUT Receptacles

NOMENCLATURE	FUNCTION
LEFT FRONT CENTER RIGHT FRONT LEFT EXTRA RIGHT EXTRA RIGHT SURROUND (Q) LEFT SURROUND (P) SUBWOOFER	Audio inputs for use when CDS is used with non-digital sound systems

AUDIO OUTPUT Receptacles

NOMENCLATURE	FUNCTION
LEFT FRONT	Audio inputs to theatre power amplifiers (from the operative sound system - CDS or non-digital)
CENTER	
RIGHT FRONT	
LEFT EXTRA	
RIGHT EXTRA	
RIGHT SURROUND (Q)	
LEFT SURROUND (P)	
SUBWOOFER	

NOTE: Some models of the CDP-1000 Processor may use XLR type connectors for the audio input and output connections.

Supplied Cables and Connectors: All required cables and connectors required for connection between the Reader and Processor are furnished with the system. The Reader-to-Processor cables are supplied in lengths of 50 feet. The cables are supplied with connectors to be installed on each end of each cable. The cables may then be trimmed to their required lengths and passed through conduit and passageways before installing the connectors on each end. The cables are then connected to the above-listed receptacles on the rear of the Processor cabinet (see figure 3-6). Specifications for all cables and connectors are listed in **Appendix II - CABLE AND CONNECTOR SPECIFICATIONS.**

Power Supply Cable: The power cable is a standard 3-conductor AC power cable, with plugs at both ends, moulded to the power cable. The female plug at the one end is for connection to the power receptacle on the power inlet module of the Processor (figure 3-5). The male plug at the opposite end is for connection to the external AC line source (wall outlet).

CAUTION: Do not use a ground-lifting adapter, and never cut the ground pin on the standard U.S.A. 3-prong connector.

Reader to Processor Cables: A 1-inch electrical conduit fitting is provided on the housing of the Reader for the entry of the three electrical cables from the Processor. The method of running as well as the type of protection to be provided for these cables is at the option of the installer. However, completely enclosed hard or flexible electrical conduit is recommended for maximum protection. An alternate method of protection is to support the cables overhead, keeping them away from foot traffic. If any cables must be placed on the floor, make sure that they are in an area of minimum or no foot traffic. If possible, place protective materials over any cables on the floor.

Lamp Module Power Cable: The Lamp Module Power Cable provides the low-voltage DC lamp current to the quartz halogen lamp in the Reader. The Lamp Module Cable is 2 wires of No. 12 American Wire Gauge (AWG), insulated and terminated at terminal blocks on the Reader and Processor. Maximum length, 50 feet.

Connect the Lamp Module Power Cable for Reader No. 1 to the terminal block in the Reader housing, and to the EXCITER LAMP terminal block on the Processor.

Connect the Lamp Module Power Cable for Reader No. 2 to the terminal block in the Reader housing, and to the second Exciter Lamp power supply terminal block.

Note: Remove the Reader flywheel to allow access to the terminal strip.

Camera Output Cable: The video output signal from the CCD camera unit in the Reader is sent to the Processor by means of the Camera Output Cable. The Camera Output Cable is a 75-ohm RG59/U coaxial cable, terminated with twist-on BNC connectors at both ends. The Camera Output Cable is connected to the CAMERA OUTPUT coaxial receptacle (either J5 for READER 1 or J8 for READER 2, as applicable) on the Processor.

Camera Control Cable: The Camera Control Cable is a flat, twisted-pair, 16-conductor (ribbon) cable that carries the Processor-produced data necessary to control the CCD camera unit in the Reader. The cable is terminated with a 15-pin male "D" connector, male contacts, at the PROCESSOR receptacle (either J6 for READER 1 or J9 for READER 2, as applicable). The Reader end of the Camera Control Cable must be terminated with a 15-pin female "D" connector, female contacts. Both ends of the Camera Control Cable should be terminated by using a mass termination "press" to ensure good contact and to prevent damage to the housing. (Refer to **Appendix II - CABLE AND CONNECTOR SPECIFICATIONS** for details.)

Note: The Camera Video cable and the Camera Control Cable must be a **minimum** of 20 feet long to provide adequate electrical delay.

Recommended Installation: Cut Control Cable at "flat" area. Terminate the Control, Video and Lamp Cables. Insert and dress the cables into the Reader. Pull cables together through the conduit/run then terminate and install on the processor end.

INTERCONNECTING CABLES - Processor to External Equalizer and Sound Equipment

The cables and connectors for connection between the Processor and the external equalizer, amplifiers, and speakers must be supplied by the installer. The analog sound cable connections will be made at the audio input/output barrier strips on the rear of the Processor (see figure 3-6) and listed in the AUDIO INPUT and AUDIO OUTPUT tables on pages 3-14 and 3-15. The analog sound signal output of the Processor is available at the AUDIO OUTPUT receptacles. Use shielded, twisted-pair audio cables, directly wired into the Processor barrier strip.

Digital Equalizer Cabling. If digital equalizers are to be used with the Processor, check that the optional Digital Eq interface circuit board is installed in the Processor (Part No. CDE201). If the card is installed, it will be found in the Processor card rack, next to the DSP card (see figure 3-8). If the equalizer card is installed, a 50-conductor, flat ribbon cable will be connected between the card and the DIN receptacles on the rear panel of the Processor. The jumpers at W16 on the backplane (next to the DSP card) must be removed.

1. Connect the six equalizer cables to the bulkhead 8-pin, DIN connectors on the back of the Processor (see figure 3-6). "To Digital Eq" cables go to inputs of DEQ7's. "From Digital Eq" cables come from outputs of DEQ7's. (See **Appendix II - CABLE AND CONNECTOR SPECIFICATIONS** for additional cable and connector information).

   Note: Refer to the Yamaha DEQ7 instruction manual for equalizer operating procedures.

Analog Equalizer Cabling. If external analog equalizers are used instead of digital equalizers, check that the Digital Eq interface card (Part No. CDE201) is removed from the card rack and the "W16" jumpers (4) are installed on the backplane next to the DSP card (see figure 3-8). The inputs of the external analog equalizers are connected to the "CDS AUDIO OUTPUT" barrier strip with the audio shield connected on the equalizer end. The outputs of the external analog equalizers are connected to the "FROM AUDIO PROCESSOR OUTPUT" barrier strip with the audio shield connected to the "audio shield" grounding strip just below the fan on the rear of the processor.

Non-Digital Sound Considerations

The Optical Radiation Corporation CDS can coexist with non-digital sound systems (i.e., Dolby and/or SVA outputs). Special relays in the CDP-1000 Processor automatically switch the non-digital outputs to the theater power amplifiers whenever a non-digital sound track is present on the motion picture film (figure 3-7). Additionally, if the power to the CDP-1000 Processor is turned off, the Processor relays will automatically connect the non-digital audio outputs to the speaker power amplifiers.

Note: In the case where external analog or digital equalizers are connected to the CDP-1000 Processor, the equalizers are electrically connected within the CDS digital system, precede the switch-over relays, and are completely isolated from the non-digital sound signal paths. The equalizers will have no effect on the non-digital signals when such systems are in use.

To connect the CDP-1000 Processor so as to coexist with non-digital sound systems (i.e., Dolby or SVA), proceed as follows:

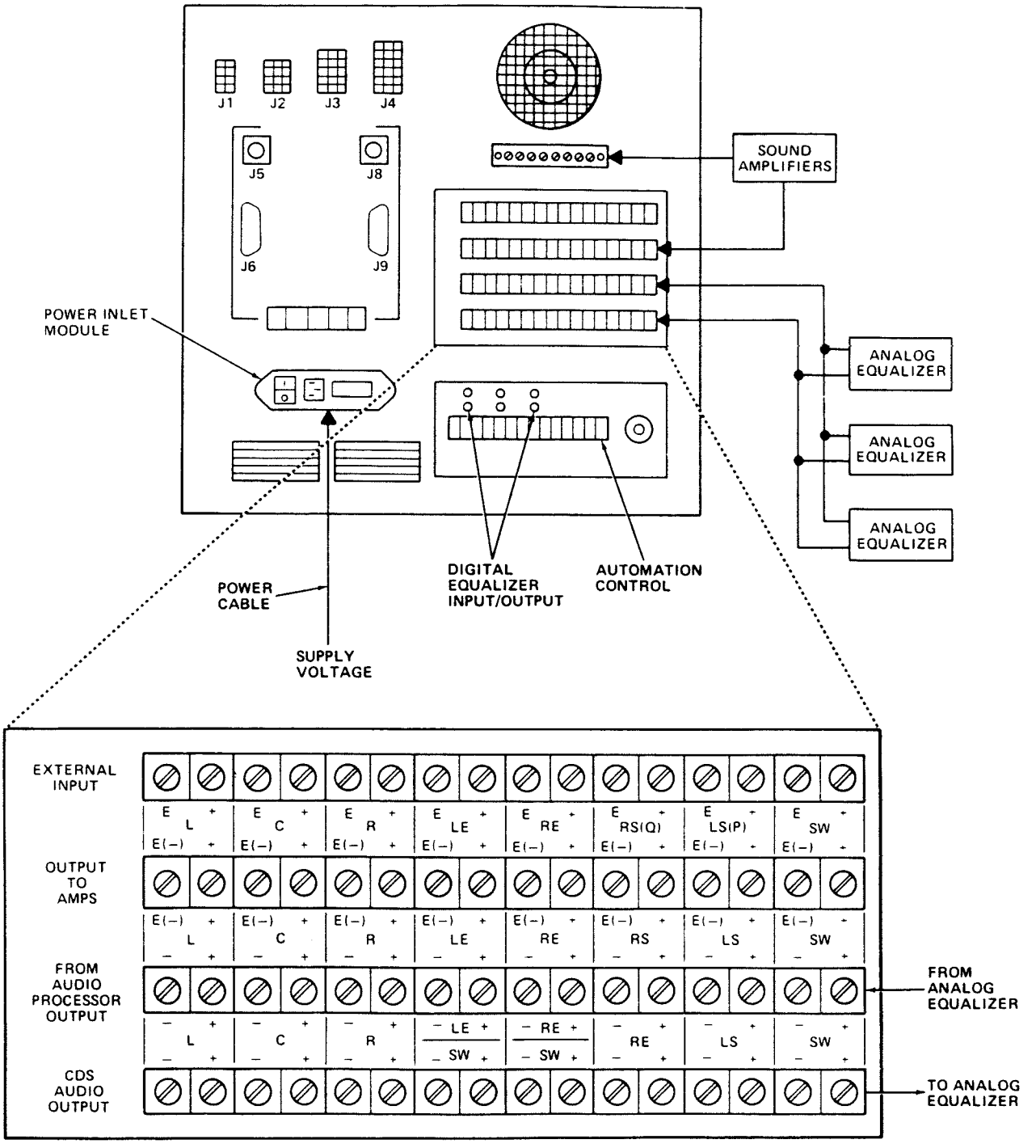
1. Disconnect the cables from between the non-digital (Dolby or SVA) audio outputs and the theatre speaker power amplifiers.

2. Connect the non-digital (Dolby or SVA) audio output cables to the EXTERNAL INPUT barrier strip on the CDP-1000 Processor (see figure 3-6) Front Panel EXT button must be pressed to allow the external inputs to pass through to the amplifiers while the CDP-1000 Processor is powered on.

3. Install the necessary audio cables (shielded, twisted-pair audio cables), between the "OUTPUT TO AMPS" barrier strip on the CDP-1000 Processor and the AUDIO INPUT receptacles on the theatre power amplifiers (see figure 3-7). Wire the audio cables directly to the barrier terminal strip.

4. If audio shields are connected at the CDP-1000 Processor, use the AUDIO GROUND strip below the fan. Audio shields should follow the convention that all inputs have their shields connected at the INPUT of each device with the corresponding OUTPUT ends not connected. For example, the connection from the CDS output to the external analog equalizer would have the shield not-connected at the CDS output, but the shield would be connected at the input of the external analog qualizer.

   Note: If analog equalizers are not used, jumpers should be placed straight across between the CDS AUDIO OUTPUT barrier strip and the FROM AUDIO PROCESSOR OUTPUT barrier strip . (See figure 3-6).



NOTE: IF ANALOG EQUALIZERS ARE NOT USED, JUMPERS SHOULD BE PLACED STRAIGHT ACROSS BETWEEN THE "CDS AUDIO OUTPUT" BARRIER STRIP AND THE "FROM AUDIO PROCESSOR OUTPUT" BARRIER STRIP.

Figure 3-6. Processor - Rear View

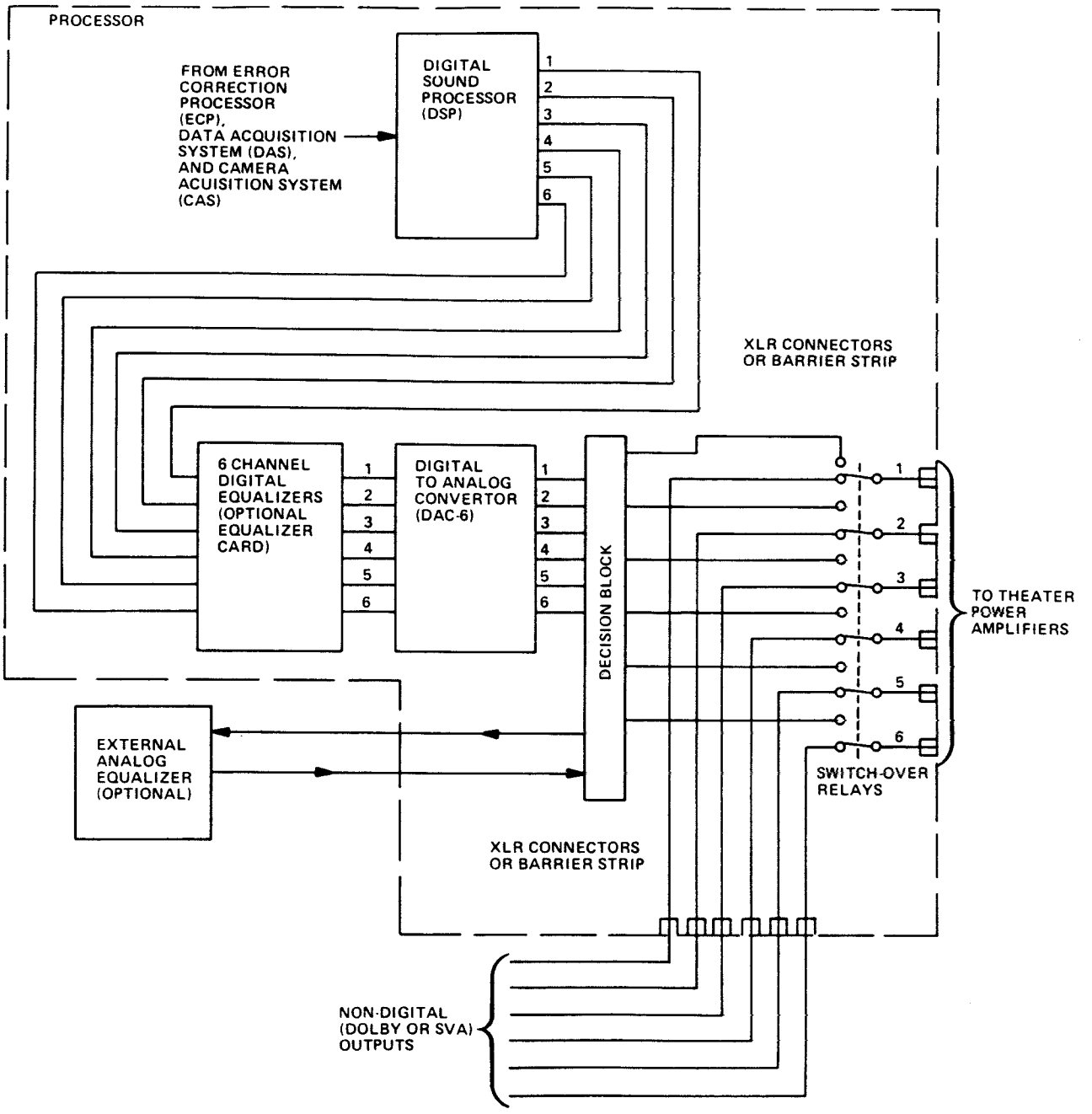


Figure 3-7. CDS Output Block Diagram - With Dolby or SVA Outputs

INITIAL PERFORMANCE CHECKS

After the Reader and Processor have been installed, and all interconnecting cables have been built and connected, the system may be turned on and the following initial checks performed:

Reader Lamp Current Measurement:

1. Remove the "TEST" jumper strap from across the outer two screws of the "EXCITER LAMP" barrier strip on the rear panel of the Processor.

2. Place a 10 amp ammeter across the two screws from which the "TEST" jumper was removed in the above step.

3. Position the power switch on the CDP-1000 Processor to "|" (on). (The reader lamp will take approximately 10 seconds or less to light to full intensity.)

4. The ammeter should read approximately 6 amps with no film in front of the camera.

5. Momentarily disconnect the BNC video cable from the rear of the processor, verifying the ammeter reading changes to approximately 6.5 amps.

6. Run film through the reader and verify the lamp current to be approximately 6.8 amps. Current will change with different densities of film but most will fall somewhere between 6.3 and 7.5 amps.

7. If the ammeter reading goes beyond 7.5 amps after step 4 or 6, the camera may not be able to supply 1 volt, peak-to-peak, at its output. This can be checked at TP1 on the CAS board while observing the "Proj1" input. If a camera output voltage of 1 volt, peak-to-peak cannot be achieved, the camera must be changed. (Some of the very early production cameras may fall below the 1 volt, peak-to-peak spec. All readers with serial numbers 200 or above should work properly with the AIC circuit.

8. Replace power supply access cover and close front panel.

9. Remove the ammeter from the exciter lamp barrier strip and replace the "TEST" jumper across the outer terminals.

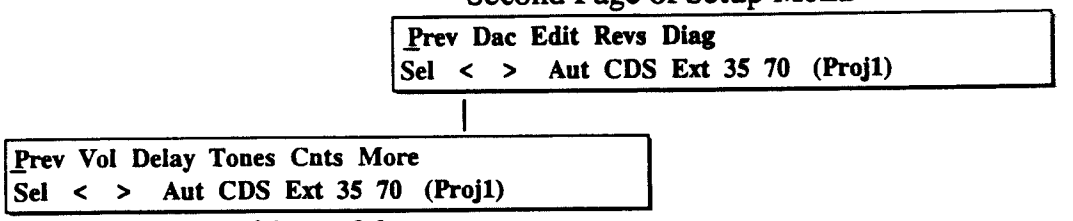
System Setup

All system adjustments are available from the Setup Menus. The Setup Menus provide for setting room reference levels, channel levels, film-to-picture delays, DAC6 configuration, and diagnostics. The CDP-1000 Processor can also generate reference level tones and noise for measuring sound pressure levels. It is suggested, that, when finished, all settings be recorded on the form provided in **Appendix VII - PROCESSOR CONTROL PANEL SETTINGS.**

There are two pages of Setup Menus as shown below. The first menu (the first page displayed when entering Setup) includes the most-used selections. The soft-label **More** accesses the second page of the Setup Menu as shown below.

Note: The Setup menu can be entered only by a special combination of button-presses (the "password"). Refer to **Appendix IV - PASSWORD PROCEDURE** for details.

Second Page of Setup Menu

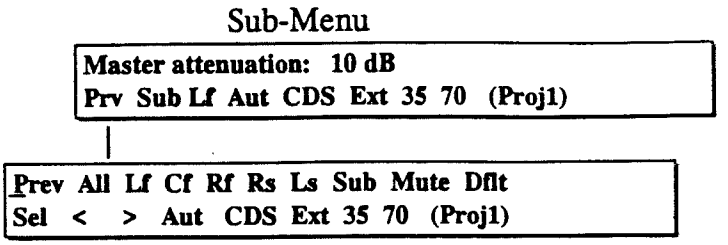


First Page of Setup Menu

Setup Menus

Reference Attenuation Menu

When **Vol** is selected at the first page of the Setup Menu, the Reference Attenuation Menu is displayed. All digital sound channel levels can be set from this menu. External sound inputs are not adjustable. All levels are expressed as attenuation. Increasing the sound *reduces* the number displayed (**0** = minimum attenuation; **47** is maximum). A convenience feature when making channel adjustments is rotating to the next channel without having to go up a menu level. This permits fast selection of the desired channels.



Reference Attenuation Menu

Default Volume Level

This selection will return all attenuations to their original pre-programmed level. Default menus always ask for confirmation before the change is made. Press the **Sel** button to cancel.

Muting Channels

Though not a menu selection **Mute** lets the operator turn the sound on or off. All channels are affected *except* the individual channel being adjusted. For example, to turn on only the center channel first **Mute**, then adjust the center channel. Adjusting a different channel will mute the center channel and unmute the new channel. This is also a method when making single channel measurements. The master attenuation is controlled by **Mute**. The sound is automatically unmuted when returning to the Operator menu.

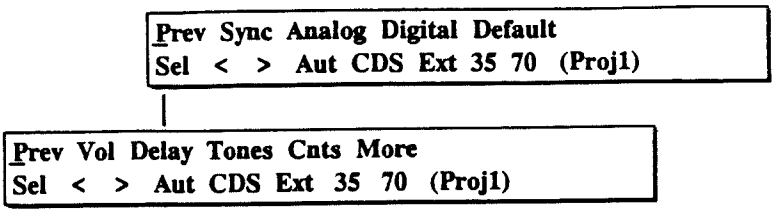
Master Attenuation

Changing the master attenuation (**All**) sets a new room reference level and automatically zeros the operator volume level. Normally this reference level is set to 85dB C weighted as measured on a sound level meter. The source of the noise reference can come from an 85dB pink noise reference film, the internal tone generator, or other reference sources such as the data simulator.

Individual Channels

All six CDS channels are individually adjustable. Single channel adjustments can be made with or without other channels enabled. This provides the ability to fine tune the attenuation levels either subjectively or through use of a sound level meter.

Delay Menu

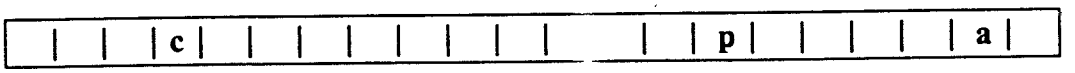


70mm Delay Menu Selected From Setup Menu

These menu selections sets the camera/picture/optical pickup delays. These delays must be tailored to each projector installation, thus are usually set once. Setting the values is simply a matter of measuring physical film distance in picture frames. All delays have 1/4 frame resolution. Separate lip sync delays must be set for 70/35mm units. The currently selected film delay format is always indicated at the **35/70** buttons.

Measuring Delays

First note the film roller position of the Reader Penthouse unit. Assuming that the Reader Penthouse is in the 35mm position set the system into 35mm delay. The 35 button should be lighted. The next step is to thread the projector with a piece of scrap 35mm film. Mark on film the frames opposite the digital camera, picture gate, and 35mm analog pickup. Starting with the digital camera mark count the number of frames to the second and third marks.



Film Sample

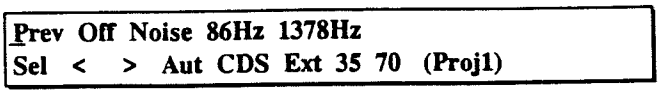
Lip Sync Delay: The CDS film format aligns the picture and sound together without any offsets (dead sync). The lip sync delay ("C" to "P" on the marked film sample) sets the delay from when the sound is read by the camera to when the corresponding picture frame is projected.

Analog Sound Delay: The CDP-1000 Processor can detect the presence of an analog (SVA) sound track, thus allowing the mixing of CDS and SVA films. When a SVA film is detected, the CDP-1000 Processor will delay switching the sound input until the SVA track is at the optical pickup. This delay is the distance ("C" to "A" on the marked film sample) from the camera to the optical pickup, plus one frame (for the splice).

Digital Sound Detect Delay: The opposite case to the Analog detect is detecting digital sound following a SVA film. This delay is the distance ("C" to "P" on the marked film sample) from the camera to the picture gate, plus one frame (for the splice).

Tone Generator Menu

The CDP-1000 Processor has the capability to generate 85 dB reference noise and test tones. These tones can be used in place of, or in addition to, the 85 dB Pink Noise Reference Film. The internal noise reference is balanced to the 85 dB reference film.



Tone Generator Menu

Enabling the **Noise** sources requires the processor to perform some calculating and filling of internal memory, thus the display of the "WAIT" message and a numeric countdown. The noise source replaces the normal digital data input, and remains on until the operator disables the generator by selecting **Off** or going back to the top menu. This allows attenuation adjustments or sound measurements of the channels.

Noise Reference: Select **Noise** to obtain the 85 dB noise reference. This noise reference duplicates the level and spectrum of the 85 dB Pink Noise Reference Film. It is used to set the room volume levels to the industry standard reference of 85 dB C weighted.

86Hz Test Tone: The **86Hz** test tone selection is primarily used to measure the adjustments of the sub-woofer channel on the DAC6 board. The 86 Hz gain initially starts at -20, and is adjustable.

1378Hz Test Tone: The **1378Hz** test tone selection is primarily used to measure the adjustments of the full bandwidth channels of the DAC6 board. The 1378 Hz gain initially starts at -20, and is adjustable.

DAC6 Menu

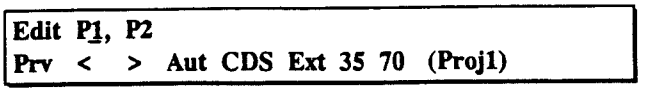
DAC is a selection on the "more" level of the Setup Menu. The **DAC** menu provides the means to tell the CDP-1000 Processor which DAC6 board is installed: the **Old** or the **New**.

"**New**" represents printed circuit board P/N 909483-001.

"**Old**" represents printed circuit board P/N 909022-001.

Editing The Projector Labels

The **P1** and **P2** automation labels may be changed to different designations from the Edit Menu.



Edit Menu

1. Select **Edit** on the "More" page of the Setup Menu to enter the Edit Menu (above). The cursor will be located under **P1**.

2. Use the arrow buttons to move the cursor to **P1** or **P2** as desired.

3. To change the character of the item the cursor is on, rotate the **SCROLL** knob.

4. Select **Prv** to return to the previous menu. The edit changes will take effect when returning to the previous menu.

Equalizers

Set the equalizers for the proper theater response. (Refer to manufacturer's literature for procedure.)

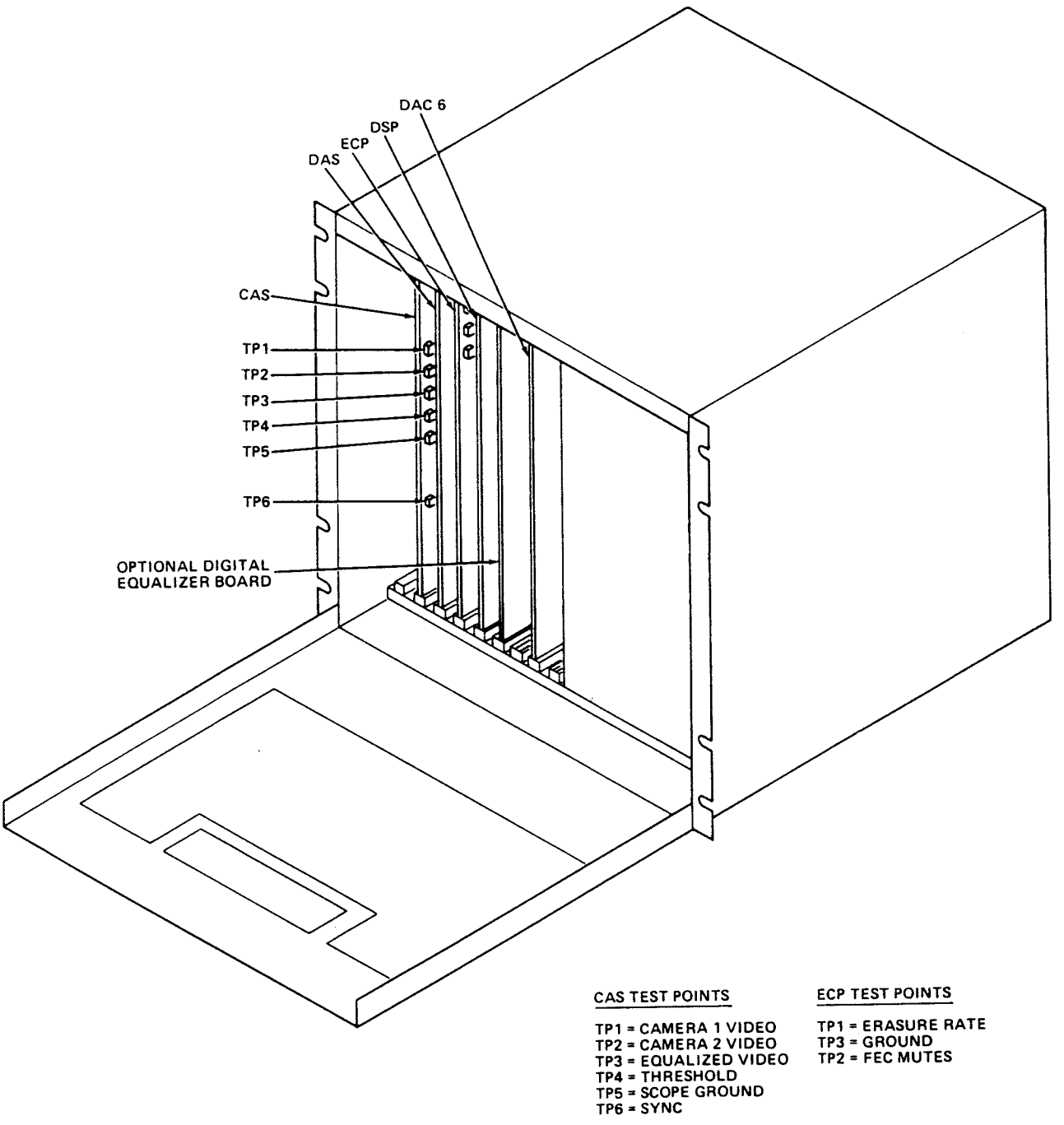


Figure 3-8. System Printed Circuit Boards and Test Points

Appendix I - SPECIFICATIONS

Number of Sound Channels			Six 5 full-bandwidth 1 sub-woofer
Dynamic Range			> 90 dB
Channel Separation			> 90 dB
Frequency Response			
	Channels 1 through 5		20 Hz - 20 Khz ±.5 dB
	Channel 6		20 Hz - 100 Hz ±.5 dB
Total Harmonic Distortion + Noise			< 0.01%
Synchronization Track			SMPTE Time Code
Auxiliary Control Channel			MIDI
Film ID Information			ID Data Fields
Signal Outputs			Balanced 600 ohm, +4 dBm
Adjustments			None, Intelligent Front Panel Control
	Ambient Operating Temperature		Up to 104°F (40°C)
Weight:	Reader		25 pounds
	Processor		82 pounds
Mounting:	Reader		Adapts to Projector Housing at existing threaded bolt holes or by means of interface adapters
	Processor Cabinet		Can be installed in standard 19-inch (483 mm) racks or cabinets of minimum 21-inch depth
Dimensions:	Reader	Height	9.6 inches
		Depth	10.5 inches
		Width	12.0 inches
	Processor	Height	17.5 inches
		Depth	18.0 inches
		Width	17.0 inches (18.88 inches wide at rack mount tabs)
Power Requirements			Four selectable nominal operating voltages: 100 Vac, 120 Vac, 220 Vac, 240 Vac, 50-60 Hz, single-phase, 480 volt-amperes (voltage tolerance: +5, -10%)
Fuse Requirements			6.3 x 32 mm (North American 3AG) or 5 x 20 mm (European) 8-ampere fast-blow for 100/120 Vac 4-ampere fast-blow for 220/240 Vac